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Lowell Textile Journal

A PRACTICAL SYSTEM OF COLOR EDUCATION.

"COLOR DEFINITIONS."

By MILTON BRADLEY, - - - - Springfield, Mass.

The modern advance in industrial education by which manual occupations are being placed on a higher plane of intelligence and efficiency than ever before, has led to an advanced study of color as applied to the arts and manufactures. This new interest has not only revealed the lack of a definite popular knowledge of the principles involved in pleasing color combinations, but has also shown the necessity for a more accurate and complete vocabulary in which to discuss the subject, before there can be any widespread increase in accurate information regarding these most interesting phenomena in our daily lives.

There is not only a lack of definite information in the minds of many people regarding color terms and their proper use, but there are only meagre sources from which information may be obtained by those who may have a desire to inform themselves as to the correct use of the few common words relating to this most interesting subject.

We are accustomed to rely upon our dictionaries and cyclopedias for correct definitions of such words as we find in our reading or which we may desire to use in our conversation and correspondence. But in looking to these sources for definitions of popular words relating to color one is doomed to disappointment and confusion. This fact is not referred to here with a purpose to criticise the labors of the distinguised men who have served as editors of the many most valuable cyclopedias and dictionaries which are now placed within the reach of all at reasonable prices; but merely with the purpose to call attention to the necessity for some popular agreement

upon terms to be adopted by common consent, which shall definitely express the impressions produced by the varied color effects with which we are constantly surrounded in nature and the arts. As in form so in color a few pop ular words are used to express the multitude of impressions received through our eyes regarding natural and artificial objects. But in form the terms used are based on the definite and well understood principles of mathematics as employed in geometry, in which accurate statements can be made in the divisions of the circumference of a circle and the foot or meter. When we shall have generally accepted standards of color designated in terms of that quality of color recognized as its wave length we may have as intelligible a language of color in the arts as we now have of form.

The more common color terms can almost be numbered on one's fingers and are practically included in the following brief list: Color, Hue, Tone, Tint, Shade, Purity, Scale, Luminosity, Broken colors, Intensity, Harmony. Of these the first five are most common and are so often misused that no definite impressions are produced by statements in which they occur.

True there are in natural and artificial materials an unlimited number of colors distinctly different from each other, but no definite names for them have been adopted in popular usage. For example, what color does the name Red bring to mind? It may mean anything from Carmine (which covers an indefinite range from violet to red), to Vermillion, which in its several commercial grades includes various orange reds; and when a more accurate term is desired for any color, it is not to be found because of the lack of accepted standards on which to base a nomenclature.

While this is all true concerning names for full, pure colors, there is even greater confusion in the use of terms already adopted to express various colors which do not approximate purity. As before suggested, it may at first thought seem that it is the duty of the authors and editors of our dictionaries and cyclopedias to supply this lack, but they may say, with a large degree of truth, that it is their duty to furnish the generally accepted definitions, and neither to coin new words nor to add to or take from the definitions already in common use.

If this is the position assumed by the makers of our most popular and valuable dictionaries, as probably it necessarily is, it seems that we must look for reform to our

educators, artists, art teachers, and art writers, in fact, to all who deal with colors and use color terms. These authorities must unite on some single code or color expressions which they will agree to use in a definite sense in their writing and their conversation.

Referring to the more common color terms already mentioned, Color, Hue, Tone, Tint and Shade, we may briefly consider some possible measures or reform in their use.

Various definitions for the word Color may be offered, but as there is no very general misuse or misunderstanding of this term, it is not profitable to extend these notes by technical criticisms of its use.

Hue. This word is so nearly identical in meaning with Color that in many cases the two words may be used interchangeably, but there is one use of hue in a qualifying sense which is peculiar to itself. For example, in the Solar Spectrum we have red and orange so gradually merging into each other that no line of change can be detected; and the same effect is imitated when red and orange pigments are skilfully blended together on a surface. In this case the color nearer the edge of the painted surface is an orange hue of red, and nearer the orange edge it is a red hue of orange.

This statement applies only to two colors which are adjacent in the spectrum, and to red and violet which may form a pair when the six standard colors are arranged in a circle, thus bringing the red and the violet together. Such an arrangement of the six standards with two hues between such pair forms a pleasing succession of colors which may be called a chart of the spectrum circuit.

Also a very dull brown, for example, may be said to have a red or an orange hue to indicate the fact that the color is quite indistinct. These two uses are somewhat unlike each other, but both may be correct, and the two seem to practically cover all the ligitimate uses of Hue, which in any degree have a meaning different from Color. In no case does Hue approach Tint, Shade or Tone in its meaning.

Tint. Tint, Hue and Shade are employed so loosely even by those people who claim to use English correctly, that neither word has a very definite popular meaning, although each is capable of being as accurately used as any other word in our every day vocabulary. Hue has already been defined, so that if Tint and Shade are clearly understood, the distinction will be perceived.

An illustration will perhaps be

more effective at this point than definitions. If for example, a full, pure, standard blue, in water color, is diluted with water and applied to white paper the result when dry will be a tint of blue. If but a moderate quantity of water is used, a deep or strong tint approaching the standard will result, and if much water is used in proportion to the color a light tint will be produced. All gradations from the full color to the lightest, approaching almost to a white, will be tints of blue. No other word properly expresses this series of colors and this word should be used for no other effects. In "body colors," tints are produced by mixing white pigment with the full color instead of diluting it with water, and also similar results are seen when sunlight shines on a full standard color. The standard or normal color of any surface is seen when it is viewed in good clear daylight not affected by reflections from surrounding objects. If the light is increased, tints result, growing lighter as the light becomes more intense, until with concentrated sunlight the color nearly disappears.

The fact must be kept in mind that in the production of true tints by illumination, the light must be pure sunlight, not affected by peculiar atmospheric conditions nor by reflections from surrounding objects other than white. All objects illuminated by light from a red sunset or a brick wall, or by light passing through and reflected from masses of green foliage, for example, will give red or green complications.

Shade is very simply described as the opposite of tint. A full color which is a standard in good daylight without direct sunlight, becomes a shade when the illumination is reduced, or if a shadow is cast on it.

If the light is diminished, the effect is a shade, and the shades may he deepened until there is no light, and then the object becomes black along with everything about it.

Theoretically any pure pigmentary color, by an admixture of black pigments, becomes a shade of the pure color. But owing to chemical combinations this is not always absolutely a truthful shade. True shades can only be accurately determined by comparison with shadows cast on colored surfaces and by the use of Maxwell rotating disks.

Tone. Probably the definite use of the word "tone" in relation to color has not become as well established as the other words in our list, but such a term is necessary to a clear presentation and discus-

sion of color effects, and should be as accurately defined as hue, tint and shade.

If tone is to be used in this connection it must refer to light and shade rather than to the variations of colors seen in the Solar Spectrum for which hue is correct. Therefore a scale of tones in color may be most simply illustrated by a series of neutral grays from white to black, and the central gray in such a scale will for our illustration take the place of the full spectrum color in a scale of the tones of that color.

This word has been used so loosely by art critics that probably no two will agree as to its meaning, but will nevertheless insist that it is a good word for their use, perhaps because it may mean anything.

If instead of the neutral gray scale, we prepare a series of colors comprising a pure standard spectrum color at the center and changing on one hand through gradually deepening shades to a color approximating black, and in the other direction through a series of tints to a light trace of the color, nearly white, we shall have what may be called a scale of that color. All these colors are tones in that scale.

If the standard selected, is green, for example, the scale will consist of tints, standard and shades of green, and each color will be a different tone of green.

In this connection it may be noticed that we have thus far considered only pure colors with their tints and shades. If a color is not pure, but has an admixture of gray, i. e., both white and black, it is called a "broken" or gray color and all its tones will be broken tones. These, which comprise many of our most beautiful material colors, constitute a very interesting class.

Practically the same terms are applicable to the colors in broken scales as in the pure scales, although because there can be no standard for a broken color from which to reckon the tints and shades, it is better perhaps to speak of these several tones as light and dark tones, rather than tints and shades. For example, a light, broken red cannot accurately be considered a tint of red without modification, although it may be called a broken tint of red, or possibly a tint of broken red, but better a light broken red.

Having briefly explained a scheme for reducing the language of color to such terms as may facilitate a definite expression of color facts, some examples of the incorrect and indefinite use of the common terms regarding color,

which are made by intelligent and well informed people when speaking or writing about the subject may be of value. This incorrect use of these terms has arisen from the general lack of knowledge regarding the simple elements of color which prevailed a generation ago, and has been perpetuated because of the very common opinion that there is in color something mysterious that cannot be reduced to rules and measurements.

In considering the following quotations from various sources the reader must recall the definitions already given for the words hue, tint, shade and tone, remembering also that these extracts are very largely made from the most popular and reliable modern dictionaries of the English language, and a few only from popular publications of the day.

Italics are employed to emphasize the words incorrectly used.

Color.

Color is so well recognized as a whole that a definition of it is not very important in ordinary conversation or writing, but the following is perhaps, as good as has been formulated in a few common words.

1. "Objectively, that quality of a thing or appearance, which is perceived by the eye alone independently of the outline form of the thing."

(Note. The word outline is perhaps important in this definiti n because all other appearance of form is usually, perhaps always, produced by light and shade which is color.)

The following definitions are not so good.

2. "Color is that property in bodies which when acted upon by light impresses the mind through the agency of our sight with those sensations which we denominate color." This sounds well, but is too much like the circle ending where it begins, or briefly—color is color.

3. "The *tints* of a picture." A picture composed entirely of tints would be as weak as this definition.

4. "That quality of a body which affects our sensation regarding color." Practically like No. 2, but more concise.

Hue.

1. "The particular *shade* of a color; that in which one color or *shade* differs from another color tint." If the intention was to say that hue is the difference between a shade and a tint, the definition applies much better to tone than

to hue, but probably the idea in the writer's mind was as indefinite as it seems on paper.

2. "Color or *shade* of color, *tint*, dye." Accepting this there is little use for any other word, so wide is its range.

3. "A prominent *shade* in a composition of primary colors." It is difficult to extract an assumed truth from this.

4. "Color or *shade* of color, a compound color in which one of the primaries predominates, *tint*. This seems equally obscure.

5. "The particular *shade* of a color."

6. "Color, specifically and technically, a distinctive quality ofcolor in an object or in a surface."

Hue seems to have been generally understood to be so nearly synonymous with color that many of the editors of our dictionaries have been unable to determine the difference by a comparison of its popular uses, and have accepted the two as synonymous. The qualifying uses of it as recommended in our foregoing definition, seem to be the only exceptions to this view which are of practical value, and these uses are believed to have become of such importance as to warrant their permanent adoption as the definition of the word.

Tint.

1. "A tendency towards or a slight admixture of a different color *tinge*, as red with a blue *tint*." The impression naturally to be derived from this definition and example seems to be that a purple made from red and a little blue would be a tint of red, whereas, it would be practically a broken violet red, or a violet hue of red.

2. "A color considered with reference to other very similar colors, as red and blue are different colors, but two *shades* of scarlet are differents *tints*." It is quite impossible to determine what meaning the writer intended to convey in this definition. If the words "shades" and "tints" are correctly used the statement is a contradiction, and if shades is used for tones, then the statement is that two tones of scarlet may be two differents tints, but they might also be a shade and a tint, or two shades, or the normal scarlet with either a tint or a shade.

3. "A slight coloring distinct from the ground or principal color. a *shade*, a line of color."

4. "A tinge, a color, a dye, a slight coloring distinct from a principal color, a *shade*."

5. "A variety of color, a tendency toward a different color, tinge, hue, especially when light."

No definite color information on or meaning is conveyed in 3, 4 or 5.

One authority says truthfully: "To understand distinctly the different qualities of tint and tone, and to separate them from the very loose manner in which they are occasionaly if not generally spoken and written on, even up to the present time, it will be useful to probe slightly the science of color itself."

In view of the absolute dependence of all color, truths on the science of vision, the last few words seem like sarcasm, although there is no evidence that they were so intended.

Shade.

This word is more correctly defined in the dictionaries than either hue, tint or tone, but in common statements such as are made in trade and fashion magazines, we find it used very loosely. One article on Autumn fashions says:

1. "These are some of the new *shades* of green in the clear and pretty tints of different varieties of apples."

2. Several are mentioned as "Cherry Red *shades*, while Gebriel is still another pink."

3. "Etna, Abrecot, etc., are *flame shades*."

4. "This Autumn there are fifty new *shades* in millinery goods and one hundred and fifty-six in dress goods."

5. "Green promises to be the leading color in dress goods, but with all the *shades*, there are to select from no one need wear green to whom it is not becoming." In this statement it is evident that "shades" means "colors" or perhaps "hues."

In all these quotations "shades" and "tints" are used interchangeab'y and both instead of hues or colors as far as one may judge from the context.

6. "Shades named for Louis XV and XIV are a number of delicate medium, or very pale *shades* of light colors.

Although the dictionaries are more correct regarding the use of the word shade than the popular publications above quoted, there is ample room for improvement as may be seen in the following definition of shade.

"Degree or variation of color as a darker or lighter, a stronger or paler, as delicate *shade* of pink."

A pink from its popular name covers a class of red *tints* and hence a *shade* of pink is a shade of a tint of red which technically is a light broken red, or in other words a gray red; which probably is not intended. "Delicate pink," or a "light pink" would probably have expressed the writer's meaning; quite the reverse of a shade.

TONE.

1. "The degree of the luminosity of a color, the power of a color to reflect light and to be prominently visible." A very good definition.

2. "The shade, hue, or degree of color, as a deep tone of red." This definition in the adoption of the words "hue or degree" loses the more truthful meaning implied in the word shade, which if used alone would partially indicate the true definition for tone, and which is practically given above in No. 1.

2. "It depends first upon the right relations of objects in shadow to the principal lights and secondly upon the quality of color. The term is often used to qualify or as synonymous with depth, richness and splendor in pictures."

4. "The prevailing color of a picture or its general effect."

The last two definitions are as indefinite as are the majority of the color definitions found in print, and have as little practical value.

The few examples of the seeming misuse of color terms which are criticised in this paper, cover but a small part of those which could be named, and these have been selected because they are of such a nature as to admit of intelligible criticism from the writer's standpoint without extended explanations and discussion.

With very many of the children in the public schools of some sections of our country the terms here advocated and the standards recommended are as familiar and are used as glibly as the simple geometrical terms relating to form, and with as much intelligence.

GENEVIEVE.

She was dainty, she was pretty,
 She had talents not a few;
She could read and write in Spanish,
 But she couldn't make a stew.

She could say the most delightful things,
 Her laugh would turn your head;
She could paint and sketch and whistle,
 But she couldn't make a bed.

An adept at French and German,
 And at dancing very swell;
Yet when it came to frying fish,
 She never felt quite well.

To paddle made her tired,
 Though she really loved to steer;
But she couldn't wash the dishes,
 It made her feel so queer.

She could sing when things were suitable,
 But that was very rare;
She could play a grand piano,
 But they didn't have one there.

She was a bright and clever girl,
 But she couldn't trim a lamp;
And the universal verdict ran:
 She was no use in camp!

ORMSBY A. COURT.

ON THE MANAGEMENT OF HELP.

One hears so much from time to time on the subject "How to Manage Mill-help," from men who are conspicious failures in that respect, that one marvels that there are any help left to manage.

Perhaps the word help is an irony in this respect for it is not of the poor, docile creatures who are styled, incongruous though it may be, regular employees that this article speaks; they do not need management in the sense intended. The reference is to that vast army of peripatetics who, like the unfortunate majority, know no rest, therefore, remarkable is the person who, versed only in the directorship of the steady employee, can essay successfully, and with credit to himself, the overseeing, not overlooking, of this most republican of bodies.

On reflection, how often man inwardly endeavors to convince himself that he has done what he hasn't. Perhaps he does it from a sense of duty, or self-justification, or inate egotism; perhaps.

Of course it is understood that all those who have to do with the governing of help pride themselves on the discipline used. But is there such a thing as the discipline of the lexicon in a case of this kind? Not at all. Any belief that there is, is at best a chimerical fancy born of conceit and nurtured by the consciousness of inability. The discipline in vogue at the present time is faulty in conception and construction because it is nonsensical to introduce it and ridiculous to even think of enforcing it with this class of workpeople. Plainly speaking it is a failure and therefore useless. There are methods; the Russian government has an able one; and our Army and Navy have undoubted systems that yield marvelous results, but they are scarcely feasible where mill-wheels grind, a regretable fact.

How often you hear men quoting the cream of their "so many years of experience." Experience forsooth, but not the teacher. Here is an enviable opportunity, why don't some of these men employ a portion of their gossiping time to devising a new or improved method of local government that will not puncture? Are the avenues

of invention blockaded? Improvements oral and practical are constantly being applied to factory machinery yet there appears to be no effort put forth in the direction most needed. Surely with such a field for original thought and the ample opportunities for experimental work at hand there ought to be something besides sterility. Of course we all realize that glory only awaits the pioneer of this necessity, and we are all duly sympathetic for this reason. Yet considering the boon that the discovery of a practical system would mean to suffering overseerhood compels us to believe that a man of ideas wouldn't and couldn't allow for a single instant the concealment of his find for such a debasing reason as its non-pecuniary value.

The theory that such a system exists incog is untenable, because the moment of its demonstration means the heralding of it to the remotest settlement in the manufacturing world.

Perhaps the captious critic, or pessimist of experience, whose cynical eye may for the moment dwell on this plaint, may from his exalted position sneer at these nevertheless existent truths because no plan for reformation has been proposed. Primarily there was no intention of so doing, that would be presumption, yet as the extent of the evil is realized it might be advisable to proffer a suggestion, one that seems after much serious consideration to possess qualities that ought at least to commend it to the attention of the student of help culture. It is applied hypnotism. Does the reader recognize the immensity of the idea, its limitless scope, the possibilities it embraces and the advantage that mind in the future would have over matter? C.

FABRICS AND TEXTILES.

The fibres used in the manufacture of textile fabrics may be classed under three distinct headings: Animal, Vegetable and Mineral.

Those most commonly known are, Wool, Silk, Cotton, Linen, Hemp, Flax, and Tinsel or Metallic threads.

Animal Wool—The natural pro-

duct of the sheep is undoubtedly the most important fibre used in the manufacture of textiles for outergarments and warm clothing. In commercial phraseology, the term "wool" is applied to the hair of the alpaca, goat, beaver, rabbit, but strictly speaking, it belongs to the sheep alone, his fibre, from time immemorial, has been woven into cloth. Wools come from all parts of the globe, English, Irish, Scotch, Canadian, Australian, Cape of Good Hope, Tasmania, Odessa or Russian, Indian, North and South America.

All these wools have their specific values and properties.

There are several and distinct classes of animal fibres that are not generally known, which I wish to bring before your notice. Cashmere is the hair of a goat (Capra-hircus) that thrives best upon the Himmaleh Mountains, the higher the altitude the finer, softer and thicker the coat of hair is found to be.

Nearly all of this staple is manufactured into Shawls, in Cashmere, which is the name of a country and a capital city, in the northwest of India.

The Cashmerians have become celebrated, not only throughout Asia, but in Europe and America, for the beautiful shawls they produce.

These Oriental shawls are woven by a very slow process, and are therefore very expensive, being sold in Paris and London at from five hundred to two thousand dollars each shawl.

The wool is spun by women and afterwards colored, these shawls are made both long and square, the former measuring generally fifty-four inches wide and a hundred and twenty-six inches long; the latter are from sixty-three to seventy inches square.

A fine shawl with an all over pattern upon it, takes nearly a year in making. The people employed sit on a bench at the frame, sometimes four people at each, but if the shawl is a plain one, only two. The borders are worked with wooden needles, there being a separate needle for each color, and the rough part of the shawl is uppermost whilst it is in progress of manufacture.

The finest of them are composed of a material exquisitely soft and warm, surpassing in this respect probably any other that has ever been fabricated for clothing.

The material is derived entirely from the Cashmere or Thibet goat, it is to the peculiar beauty and fine texture of this wool that the shawls owe the high estimation in which they are held.

To the people of Cashmere this

manufacture is very important; about 16,000 looms are continually at work, each one giving employ ment to three persons.

The annual sale in Cashemere is calculated at thirty thousand shawls.

The cashmere wool imported goes into Europe through Kasan, on the eastern bank of the Volga, and also directly from India and Persia. What little is exported from Cashmere may be said to be of three kinds of colors, white, grey or brown.

The word cashmere is designate in the dictionaries, as a rich cloth of downy wool, a rich shawl.

The word is also used to designate certain fabrics made of wool or silk warp, with fine goat hair or fine merino wool filling. Cashmere sateen is a smooth, lustrous material, the warp and filling of which are combed wools.

Cashmere Muslin, the warp and filling of this fabric have little twist, and are woven very loose and open, warp is cotton, the filling combed wools or worsted, sometimes this fabric is known as "Muslin demi laine."

Cashmeret is a fabric more like cloth in its manufacture and appearance, the warp of the best kinds is of a peculiar floss silk and woolen filling.

Cassimere is supposed to be derived from cashmere. Cassimere is a woolen cloth use chiefly in the manufacture of men's clothing.

The writer is indebted to Jno. T. Watson, Esq., of the Royal Engineers, Bombay, India, for the data in reference to the Cashmere Shawl.

A NEW BOBBIN.

Intelligence has just been received from Switzerland, that new bobbins are being constructed of rhinoceros skin, which is suitably prepared by various chemists, and thus furnishes a bobbin far superior to the wooden or fibre bobbins; the advice received further states that said bobbins are molded and can be made as cheap as the wooden ones and are taking the place of the wooden bobbins.

We may comment upon the bobbin by stating that such bobbins are not entirely novel, as in 1876 a certain Ernest Zeppert produced a bobbin out of sheep skin, which latter was rolled or curled into the shape of a bobbin. The same has been tried, but did not give entire satisfaction, and accordingly was abandoned.—*Am. Silk Journal.*

THE PEN IS MIGHTY.

An amateur editor has just made a fortune by his pen. His father died of grief after reading one of his leading articles, and left him $50,000.

PERSONALS.

Mr. W. P. Turner, from the Perdue University, La Fayette, Indiana, during his vacation paid a visit to the Lowell Textile School, and was surprised to find such a perfect equipment of machinery in the cotton, woolen and worsted, carding and spinning departments, the variety of looms in the weaving departments was the largest he had seen.

Mr. James Hellawell of Keighley, England, called at the School and had a look round the various departments, he declared it was the finest equipped Textile Institution he had seen.

Mr. James Shaw of Oregon City, Oregon, during a short stay in Lowell, inspected the several departments in the Textile School, and expressed himself as highly pleased with the successful showing of the students' work.

James H. Cuttle has spent the summer vacation with the United States Bunting Company. James has had a hot time, he says that he has been reduced in weight some 13 pounds.

C. E. Soderberg has been employed in the drafting department of the Lowell Machine Shop.

S. A. Hooker spent a few weeks in the Boott Mills.

Arthur Stewart has been with the Dominion Woolen Manufacturing Company, Beauharnois, Quebec.

W. D. White has found employment in the drafting department of the Lowell Machine Shop.

E. T. Tilton has been improving his knowledge of weaving at the United States Bunting Company.

Jos. W. Bailey took a position as assistant in the designing department of the Boston Manufacturing Company, Waltham, Mass.

H. R. Bodwell, has been spending his vacation from school duties in the carding department of the Washington Mills, Lawrence, Mass.

C. W. Wainwright left Lowell to take a position in the Pattee Machine Works, Taunton, Mass.

W. B. Cole is reported as superintendent in Steels Mills, Rockingham, N. C. We all wish genial Bill Cole every success.

T. E. Mitchell has a position in the Merrimack Manufacturing Co.

Mr. Jas. Broadbent, clerk, went to England to see his mother and sisters, the good folks tried to persuade James to stay, but no, thanks, his opportunities are brighter on this side of the Atlantic, and James is the boy to know when he is doing well.

THE LOWELL TEXTILE JOURNAL.

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid $1.00
Single Copies 10
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the twenty-fifth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

The school year 1898 and 1899 has opened most auspiciously, and gives promise of better things to come. That the school is here to stay is now an assured fact, and to this end, its equipment, already large last year, has been considerably augmeLted during the past months. The curriculum has undergone no radical change, although the tendancy is to raise the standard, not that it should be beyond the reach of any who should, or could profit by it, but that it should be more worth the effort necessary to attain it. More work, and a higher grade of work is all the time demanded by the world at large, and the school hopes and proposes to keep pace with it.

It is to be hoped that all connected with the school will realize the splendid possibilities ahead, and whether student or instructor, that united in purpose, they can work toward one end.

. . .

Every one interested in the subject of "color," should read and carefully study the article, "A practical system of color education," "Color definitions," by Milton Bradley of Springfield, Mass.

. . .

By the bye, Milton Bradley says he received his early education in the Old Green Grammer School and later in the Lowell High School.

. . .

WANTED—1000 Associate Editors, you can be one of them.

. . .

May be you have a few friends who would enjoy the Textile Journal. If you will send their address we will send them sample copies.

. . .

Why have you not learnt as much as you wish? Any fault of yours? If it is find it out quickly and seek the remedy.

Never let an examination rattle you, keep a cool head, and you are safe in answering 75 to 90 per cent. of the questions.

. . .

"Snap" is that quality which makes a man work with energy and enthusiasm. It is indispensible to the student, if success is to be achieved.

. . .

The letter from the Vienna correspondent to the Daily Chronicle, (Eng.), "To Revolutionise the Textile Industry," which we publish in another column, is very interesting reading, but I would advise all students of textile design to be more diligent then ever in their studies, instead of abolishing the designer, such an invention would increase the demand for designs and designers in woven fabrics.

. . .

Then again how ridiculous, the invention will in a single quarter of an hour, accomplish what has taken the designer years to complete. We have heard of check and plaids been so loud that they could be heard ten blocks away, and that it took two coats from broad backs to complete the pattern, and these did not take years to design.

Two designers were in London, looking up styles and fashions, when one of them suddenly stoped to look at the coat on a man's back, he could not make out the repeat of the pattern, when his friend said, "Don't worry about that design, its all right, I can see the remainder of the pattern walking down the other side of the street."

. . .

Taking the matter seriously, it would appear as if this Hungarian schoolmaster (with a name that would take a Jacquard loom to weave), had all the designers, manufacturers and loom makers at his mercy, he says that it would be most difficult all at once to abolish all looms now in use, but on economic considerations he has devised a middle course (how considerately absurd) that will enable the manufacturer to introduce this new invention gradually.

. . .

We would also advise the manufacturers and loom makers to keep the wool from their eyes, both as to this or any other invention.

A. J. Pradel has been employed in the weaving department at Collins Mill, Collinsville, Mass.

TEXTILE DESIGN AND FABRIC CONSTRUCTION.

By FENWICK UMPLEBY,

Lowell Textile School, Lowell, Mass.

A French writer has said, the life of a man, if he lived to 70 years, was too short to comprehend and utilize what could be done in the designing art as applied to dress.

It is perhaps unnecessary to enlarge to any great extent at this particular time on the advantages of textile knowledge. It is well understood and appreciated by you all as a matter of profound importance. But knowledge to be of use must be practical, and let us consider in this connection to whom we are indebted for much of that of which we make use.

It is the experimentalist, he who by constant practice has mastered the mysteries of his craft, and whose knowledge extends to the numerous systems of intertexture, that introduces to the notice of the trade, novelties in cloth either in structure, design or color.

Practical technical knowledge is of the first importance in this connection, as by it the formation of a fabric may be intelligibly understood and experimentally investigated, if it is advantageous to the student of chemistry and physics to experiment in the laboratory to ascertain the constitution of matter, and the laws which govern the phenomena of the natural world, then most certainly must the art of textile designing require intricate consideration, and the art must be considered in the light of what the loom can reveal.

It is a well known fact to the whole of the manufacturing community, that many of the richest and most appreciated specimens of the weaver's art do not owe their attractiveness to a strict or ingenious crossing of geometrical lines, or from a novel and pleasing arrangement and distribution of divers objects, or from an appropriate adoption of floral form, but from some new principal of intertexture, and some new combination of weaves, producing something remarkable for its simplicity of design, neatness of appearance, and novelty of structure.

Novelties in textiles are invariably either the outcome of the dis-

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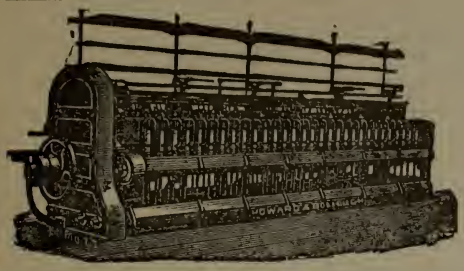
IMPORTERS AND BUILDERS OF
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CARD CLOTHING,
EGYPTIAN COTTON, Etc.

covery of a new principal of intercrossing, an original combination of colors or a remarkable rearrangement of weaves.

In the manufacture of textile fabrics, especially that designed for outward wearing apparel, we are immediately concerned in what may be developed in the way of tasty patterns, or new and pleasing combinations both of color and design, by modifying known, or inventing some new system of interlacing. Here we have an unlimited field for experiment and investigation, we may in this connection experiment along certain lines, first with a thoroughly considered and well defined object in view, and, second, in an accidental manner, keeping all the time a close watch on all possible developments bearing in mind that the gold nugget unsuspected may lay in the pan of dirt at our very feet. But where shall these experiments be conducted and where is the student to get his practice, his information and experience. The opportunities are not plenty in the places of business, the pattern room at the mill is not the place to conduct a great many experiments, as time is considered too valuable to spend on ideas, some of which must from the very nature of the case prove delusive and the caprices of fashion change too quick to give the practical designer much time for investigation.

The technical institution therefore becomes the only place where such laboratory work can be successfully accomplished. It is in other words, the place for such things, and there and there alone, the student can, under the eye of the teacher find help and encouragement for the pursuit of his studies and investigations.

The question is often raised—why are we a nation of copyists? but the answer is not far to seek. We are confronted with a condition and not a theory. Inasmuch as the European nations are alive to this very thing, and are experimenting continually for the purpose of producing something new, why should we as designers and manufacturers look to Germany, France and England for designs, from which to copy and imitate. The customs and leaders of fashion



Howard & Bullough,
American Machine Co., Ltd.
COTTON
MACHINERY.
PAWTUCKET, R. I.

may have caused this to a great measure, but there must have been a reason for all this.

Merchants of all classes of textile fabrics are continually asking manufacturers for something absolutely new in fabric, color and design, for something that will take and tickle the taste of the public and catch and please the eye of the million.

Now let us consider for a moment the object of all fashion, and to what end these exertions are made. Is it that we are not comfortably clothed already, are our garments not properly fabricated or constructed in a becoming manner by the dressmaker and tailor. Certainly not, for we as a nation are proverbally well clothed. There are no mass of people on the earth's surface today, whose clothing compares at all with ours.

But the human heart is never satisfied, a little more attractive pattern, a new style of cloth, or a new combination of colors, something must be new all the time. Then, fashions stimulate enterprise, were it not for novelty in dress, less textile goods would be manufactured, were it not for a cultivated taste, common and cheaper goods would satisfy our wants, were it not for the educated skill of our designers, their business would not have reached its present enormous proportions. The designer who brings out a new and attractive novelty has only to introduce it to the trade to find a lively demand for it. Nearly everything that is new and striking sells. So as the seasons go by the task of the designer becomes harder and harder.

To meet these conditions the faculties must be enormously developed and improved, experiments must be continually conducted for the production of novelties, and the hand and mind must be trained in the manipulation of tools, machinery and materials, till absolute perfection is attained in all branches of the conception or manufacture of textiles, and then, and not till then shall we as a nation be in a position to make true progress. It

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is true we have made some enormous strides, and I would not belittle what has been done, but considering the actual conditions which confront us today, we are hardly, "up with the times," so to speak, but success to be of a healthy nature must necessarily come without acceleration, and be of a healthy nature must grow in a gradual manner, that every point may be well understood, and every process have conservative consideration.

The manufacturers of a decade past were in a far better position, relatively speaking, than at present, as far as markets and competition were concerned, but they had not the facilities for the instruction of artisans which they now have. The competition of others is more keen, but knowledge is more widely disseminated, we are liable to misfortune, but we rise to the emergency.

It is a suicidal policy for any designer to forever copy the ideas of his neighbors, far better something original which has the recommendation of being new, and the self-reliance thus obtained, more than compensates for any little inferiority either fancied or real.

Technical education fits a man to conduct his business to the best possible advantage, and in the shortest time.

In Germany, France and England, their schools have been long established, and the students have the advantage of large and well equipped establishments together with their libraries and museums of extraordinary collections of textile fabrics, where they can examine the works of the best authors, and by knowing what has been done, know the better how to frame their own efforts, while we, starting late in the day must redouble our efforts, and perform everything that human endurance can perform to assist us in accomplishing the task before us.

Sombre shades and unassuming fabrics have vanished to a great extent, and the general tendency seems to be towards a more pleasing combination of color, design and fabric. Any fabric which has not the essence of novelty of some kind need make no bid for continuance. In fact the selling value of

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a woven fabric may be said to be almost exclusively represented by the amount of novelty of design it bears on its surface, and whatever other deficiences may be apparent, nothing weighs for a moment in the scale against originality and novelty, or I might say perhaps oddity.

Let us consider what tends to make success in designing and what influences tend to create and propagate ideas.

One of the great secrets of the proficiency of the European student is their beautiful surroundings, their periodical excursions to centers of fashion, and occasional visits to large cities to study the tendencies of the times, and fill themselves with fresh ambition to pursue their calling.

The French designer simply takes a stroll on the boulevards and observes the novelties of various kinds, in well arranged windows, and the ideas thus acquired stimulates his ingenuity and helps him to adopt what he has seen into some striking and marketable novelty.

I wish to say here that it is a mistake to shut a man up inside of four whitewashed walls, and expect him to do good work. The designer needs to be reached by outside influences, he of necessity should see what others are doing in order to gauge his own capabilities and foster his ambition. A designer should have plenty of time to do his work, an idea when once taken up should be thoroughly worked out before taking another. If not, and he is hurried from one thing to another, he will invariably produce a great quantity of inferior articles, which in the end are unsatisfactory, and perhaps disastrous to make, whereas if proper time were allowed for study and reflection, something perfect would have resulted.

A textile institution in the city of Lowell is of the highest importance to manufacturers and machine makers, who may be said to be on one common level as far as business prospects are concerned, and, therefore great hopes might reasonably be centered in the undertaking which no other institn-

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tion in the state of Massachusetts supplied, and for this reason the sympathy and support of all manufacturers and machine makers should be freely extended, in order to furnish not only appliances, but stock and material for working out in a satisfactory manner, those problems which give practical education to our students.

The spirit in which the work has been started and continued up to this time, gives strong hopes for the unqualified success of the school eventually. I strongly urge all students to begin at the A. B. C. of this profession, and study with minute thoroughness every item and operation through which they may pass, so when, once a subject has been laid aside, we may feel reasonably sure that no more can be taken out of it for immediate use. It is imperative that you should be thorough in the first place, and lay a good foundation to build on. That being once secure the rest is comparatively an easy matter, and may be compared to the man who built his house on a rock.

SIMPLE LESSONS IN PHOTOGRAPHY.

CONTINUED.

As in all other industrial pursuits, there are some tools and apparatus required. It is my intention to leave the choice of the various requirments to the judgment of the student, but I must explain and say what apparatus is absolutely necessary. These are, the camera, plateholder, lens, tripod and focusing cloth.

The camera, it should be as light as possible, of course, considered with the work it is expected to do. A good plain camera, good workmanship, and simplicity, are valuable features. The market is full of every kind of photographic snares and traps.

To those who do not know anything about cameras, the following particulars may be useful.

Size of camera is governed by

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the size of picture required, the styles most useful are the 4 inches by 5 inches; 5 inches by 8 inches; and 6 1-2 inches by 8 1-2 inches, with very few exceptions these are the sizes used by beginners.

The camera should be made of walnut or mahogany, rubber or leather bellows, folding platform, vertical moving front, single swing for the ground glass, adjustable thumb screw arrangements.

The most important part is the lens, of which, their name is legion. Fortunately, the improvement in lenses place them within reach of the beginner for a little money. A lens should have good depth of focus, this means that objects near by and objects at a distance are both clearer shown or defined, covers a good field or breadth of subject, and works with rapidity.

The tripod is the stand whereon to set the camera, this should be of the adjustable ball-bearing and extension type, so that the camera can be turned, or tilted in any direction without interfering with the legs after once setting.

The plateholder is indispensible. This is a frame for holding the dry plate, guarding it against the light. The holder is made to be placed upon the rear of the camera and coincide with the position occupied by the ground glass, so that when the image which was shown on the ground glass, will register identically upon the sensitive plate.

The focusing cloth should be made of some black material impervious to light, the size about 40 inches square, with strings at the sides, so that it can be made fast to the camera in case of wind or being misplaced when wanted.

The articles, camera, tripod, lens plateholder, focusing cloth for covering the head, are all that the amateur needs to carry into the photographic field. Of course these must have a carrying case where they can be neatly packed and kept from inquisitive eyes and mischevious fingers.

Now we can journey into the country lanes, by the river side, see shore, town or city, and take along the best of friends, which will register any view we wish to have reproduced.

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Before going too far, let us try to take a picture of our home. The first thing to do is fix camera and lens to tripod, and take focusing cloth along. Now for the position to place camera, study light, shade, position of the sun, best point of view, see that there are not obstructions in the way, such as a large tree in front of the doorway, or a vase of flowers stood in such a position that it would appear to be in the centre of the hallway, these are little matters which must have attention.

It would not be possible to take a good picture with the sun directly over the camera, or directly in front of the lens and at the rear of the subject to be photographed, the sun should be a little to the left or right and nearly behind the camera. Much depends on the selection of proper light, and time of day, so that the shadows will so appear as to give the desired effect.

The effect to be produced in a good photograph, is to so make the main subject in the picture appear as if it stood out prominent and in relief. We have all noticed this effect of relief, in a well painted sign, the letters appear to be boldly standing out from the flat surface of the sign board, the proper shading at every side and angle is duly considered, the letters have every appearance of being put on solid and as if they were raised from the surface.

Therefore do not hurry your work, study light and shade in all its aspects, always try to have some shadows, and these you cannot have if the sun is directly over head or in front of the camera, as previously stated let the light fall from the left or right of the camera, but not directly behind the camera.

These are essential points to observe in obtaining a proper position for the camera, having selected such point of vantage we may now erect the camera by placing it on the tripod, securing it by the thumb screws, but not so tight that it cannot be moved from left to right, up and down, as may be required when registering the view, be careful to have the camera perfectly level, go slow, examine the machine from all sides, this is very

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important, and I wish to lay special stress on this warning, as it will save lots of annoyance, and other expressions too common with the photographic tyro.

We will suppose all is ready, tripod set firmly in position and camera perfectly level, focusing cloth over all except the lens, slide with sensitive plate, near by and in a shady place. The lens may be fitted with the Ivis diaphragm or may have received along with the lens some thin pieces of blackened metal with holes of various sizes, these are called diaphragms, stops or openings, we shall require them before making an exposure. Now to proceed to get the view on the ground glass at the rear of the camera, take off the cap on the lens, using the largest opening or stop, now go behind the camera put your head under focusing cloth, holding the head 6 inches away from the surface of the ground glass, do not try to look through the glass, but look upon it as if a picture were painted there—Do you see anything? Probably not, perhaps you are too near, step a little further back, the image will now appear on the ground glass upside down. To get the image clearly, exclude all light with the focusing cloth, if the picture is not clear and sharp, all detail plain and perfect move the front of the camera in or out, that is to or from you until you have the image to your satisfaction, here again I say go slow, be sure and not get nervous, everything seems reversed, the trees appear to be growing downwards, people are stood on their heads, this upside down state of affairs will appear strange at the commencement, but the tyro will quickly become accustomed to the reversed condition of things and will as quickly adapt himself to it.

In the public schools of Switzerland "heat" holidays have been established by law. Recognizing the well-known fact that the brain cannot work properly when the heat is excessive, the children are dismissed from their ta ks whenever the thermometer goes above a a certain point.

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TO REVOLUTIONIZE THE TEXTILE INDUSTRY.

PHOTOGRAPHY FOR WEAVING PURPOSES.

Herr Jan Szczepanik, the youthful inventor of the telectroscope (says the "Daily Chronicle") has now made some inventions likely to revolutionize the whole textile industry, affecting as they do all its principal operations. By utilizing photography for weaving purposes he can now in a single quarter of an hour accomplish what it has taken the designer months or years to complete, according to the size of the design.

As is known, a design that is to be woven must first be resolved into squares. In the case of a large gobelin the designer has at present to fill up millions of such little squares before it is possible to punch the stencil plates which are indispensable in the Jacquard loom, and are consequently absolutely necessary for the production of figured textile goods. Herr Szczepanik, however, totally abolishes the designer, and more than sup-

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plies his place by photography. I called on the inventor in his fine new premises in the Ungargasse, and he showed me the whole of his procedure. The photographic apparatus he employs was made in Vienna, and is the largest in existence.

The Process.

The focussing screen is 1 1-2 metres square, and the bellows draw out to a length of twenty metres, while the immense lens had to be made expressly by Zeiss, of Jena. Next he employs ruled screens containing the necessary intersections. These screens or grids are on glass plates prepared by photography, and are the largest photographic negatives ever made, measuring 1.10 metres square. Each such screen contains one million squares corresponding with those which hitherto the designer, with infinite labor, has filled in in the course of as much as two to three years. Herr Szczepanik does a .ay with this whole tedious process.

Having chosen the pattern, say a landscape, the web is to show, he attaches a picture of it to an upright board fastened to the camera stand. It may be remarked it is quite immaterial what the subject may be. Whether it be a human figure or a face, a landscape or mere ornament, whether large or small, one takes neither more nor less time than the other, and causes no more trouble.

The next thing is to insert a suitable ruled screen immediately in front of the sensitive plate, i. e., the silver bromide paper. Two minutes' exposure suffices to produce an image on the sensitised paper showing the point of intersection needed; developing and fixing occupy a quarter of an hour, and then the design is finished. The different colors the web is to have are represented by different signs or figures, squares, etc., which are produced by means of corresing stops in the objective.

The second process is punching the Jacquard stencils. Hetherto this has been slow operation, carried on with the help of a machine, each square having to be cut out separ-

ately. Now Herr Szczepanik, by means of the carbon process, transfers the design on to a thin sheet of metal, thus obviating the necessities for making the Jacquard stencil on silver bromide paper. The procedure is the same as in zinc etching; the parts of the design exposed to the light are covered with gelative, while in the non-exposed ones the bare metal appears. The result is that good and bad electric conductors are formed, and all those points on this metal plate which represent holes on the ruled screen conduct the electric current. This plate is then put into a machine specially constructed for the purpose of punching it. Automatically it passes under a row of contacts which are connected with electro-magnets that set in motion levers which punch the plate.

Weaving Direct From the Original Design Plate.

But the inventor goes a step farther yet. With a similar contrivance, attached not to the punching machine, but to the Jacquard loom, he sets in motion, not only the punching levers, but also the threads in the loom itself; in short, he weaves direct from the original design-plate (as we may name this substitute for the Jacquard-stencil), by means of electricity.

"What need of this punching-machine at all," I asked, "if you can weave direct from the original design-plate?"

"It is clear," answered Herr Szczepanik, "that it would be most difficult all at once to abolish all the looms now in use, thus annihilating the great capital invested in them. Accordingly economic considerations induced me to devise a middle course, that of the stencil-punching machine, in order to enable the manufacturer to produce more cheaply and to afford him an opportunity of introducing the electric looms gradually."

At the Paris Exhibition.

In a few days, as he further told me, his first electric Jaquard loom will arrive in Vienna from the manufactory in Germany, where it has been made. It is to be exhibited at the Paris Exhibition for the first time. Before the eyes of public it will weave silk pocket-handkerchiefs. In three minutes the purchaser of such a handkerchief will be photographed by an apparatus in the loom itself, the design-plate will be prepared by the same machine, and then it will make a silk handkerchief with the purchaser's likeness woven into it, so that in not more than half an hour from the time when the portrait was taken the buyer will be

able to take away with him as a memento of the exhibition a handkerchief with is inwoven portrait, and all for a mere bagatelle.

At the Jubilee Exhibition now open here in Vienna for the present only two gobelins woven by Szczepanik's new loom will be shown. One of them contains Mark Twain's portrait. For some time the great humorist has been giving the well-known Polish painter Henryk Rauchinger almost daily sittings for a portrait for the gobelin. The other day I visited the studio and found the portrait nearly finished. It will be the best of Mark Twain ever painted. The second gobelin will contain the portrait of the Emperor Francis Joseph in his magnificent robes of state and surrounded by allegorical figures, and this portrait will also be from Rauchinger's brush. Herr Szczepanik further showed me small landscapes woven in silk. They are of wonderful beauty, and of course more exact than anything manufactured from hand-made Jacquard-cards. They have been made on his present small loom.

A ROSE.

Do you wonder that it blushes,
Pink, and sheds a fragrance rare?
Yet what cause my lady's blushes,
As it nestles in her hair?

O. A. C.

THE COUNTRY SCORCHER

Under a shady wayside tree
The cycling scorcher sits;
A jaded, weary wight is he
As he takes his bike to bits;
And the lines of his face are sad as he sees
The punctures and the slits.

Patched in, patched out, he makes it tight,
Then takes his pump to blow;
You can hear him pumping hard and fast,
You can hear him pumping slow;
You can hear him slinging naugthy words
With bated breath and low.

And children coming home from school
Creep around him by the score:
They love to see him fume and fret:
They laugh until they roar
To watch his angry sparkling eye,
As he kneels on the dusty floor.

He mounts again for another scorch,
And leaves the jeering boys;
He hears the people prate and preach,
He hears each angry voice
Shrieking aghast at his furious speed,
And it makes his heart rejoice.

It sounds to him like a note of praise;
And as away he flies
He needs must stick his monkey up:
While all he knows he tries
To do another extra spurt,
And make them ope their eyes.

Panting, pumping, pedalling!
On for his life he goes;
The morning saw his task begin,
The night shall see it close;
But of lovely scenes he's passing through,
Not a blooming bit he knows.

T. W. Collett.

In a ball-room a soft young man said to sweet girl: "May I sit on your right hand?"

Her reply was: "Why, of course not; you'd better take a chair."

SOMEWHAT MIXED.

"Mister, do you write the 'Answers to Correspondents' for this paper?" asked the visitor with the despondent countenance of the Correspondence Editor, as he leant across the desk and heaved a sigh through the atmosphere.

"Yes, sir; what can I do for you?"

"Can you answer a little question of relationship?"

"Give me the facts, and I'll try."

"Here you are: When I was a baby, my mother, a widow, married the brother of my father's first wife. He was my uncle, of course, but that made him my father, didn't it?"

"Your stepfather, you mean."

"Yes. Well, mother got a divorce from my uncle-father, and then she married the eldest son of my father's first wife. He was my half-brother, wasn't he, and also my stepfather, wasn't he?"

"It looks as if he were."

"That made mother my half-sister, didn't it?"

"I—I—I—I s'pose it did."

"That's what I thought. Well, you see, my uncle-father had a daughter before he married mother. She was my half-sister, too, wasn't she?"

"I—I—I—I s'pose she was."

"That's the way I put it up. Next thing was my mother got a divorce from my brother-father, and he—my half-brother, you know—married my half-sister. That made her a kind of stepmother of mine, didn't?"

"I—I—I—"

"Well, never mind answering yet. My half-brother-stepfather died, and now my half-sister-stepmother and I want to get married, but we can't work out if we can without being arrested for some kind of thingamy. We don't want to have our tyre punctured just as we get to scorching on the matrimonial tandem. What I want you to tell me is, what is my relationship to my brother, my uncle, my stepfathers, my half-sisters, my mother, my half-brother, my stepmother, and myself, and if I can marry her without—why, what's the matter?

The Correspondence Editor had become unconscious.

First Stranger (on railway train): "So you are selling Professor Blank's new book, are you? Strange coincidence. I am Professor Blank."

Second Stranger: "That so? Then you wrote the very book I am agent for?"

"Yes. The hardest work I ever did was writing that book."

"Well, well! That's another strange coincidence The hardest work I ever did was trying to sell it."

Lowell Textile Journal

A VISIT TO THE LOWELL TEXTILE SCHOOL.

From Fibre and Fabric.

The visitor to a textile school finds much to interest him. If he is a yarn or cloth manufacturer, the ways and means provided to instruct the textile student are worthy of his attention, and the equipment of machinery and the work in process are interesting from a standpoint of comparison with the facilities of a manufacturing establishment.

In these days, when each of us has his own particular part to do, and when a knowledge of other processes, even in the manufacture of the article which our work helps to produce, is not essential, unless we care to make a study of each process the material goes through, it is not remarkable that we get into a rut from which we have not the ambition or inclination to extricate ourselves, especially when our daily work demands all our time and energy.

The average shoemaker knows practically nothing as to how his clothing, household goods, etc., are manufactured. The ordinary weaver is almost totally ignorant of the material and processes employed by the paper maker, and vice versa.

Nevertheless, almost everyone to whom the opportunity is given, without much exertion on his own part, is as interested to see, if not understand, the means by which the side of leather is converted into shoes as he is to know how the bag of greasy wool is made a handsome piece of cloth. The Lowell Textile School is admirably equipped for its work. The staff of instructors is of the best. Machines are provided to receive the raw material and carry it through the different stages of manufacture. The cotton spinning department is furnished with a set of machines that would be a revelation to an overseer in an out of date country mill. They are new,

of the latest pattern, and provided with all improvements. The cotton is received just as it is picked from the field. The bale is dumped beside a gin where it is separated from the seeds; the picker, lapper, drawing, etc., then make it ready for spinning, both the mule and ring frame being used for this purpose. This room also contains a slasher which, with the other machines, shows all the processes used to convert the unseeded cotton into yarn ready for weaving. In this department is also a dismantled ring frame, with all the working parts exposed, giving an opportunity to draft and study the machine, its various parts and movements. Another useful device is a combination of gears, which have been assembled merely to show the means and results of employing different principles of motion. They are so arranged that they can be revolved by cranks as a whole, or in part, and it is a very effective demonstration of this important part of the work. The woolen and worsted spinning room is also furnished with the best machine builders make. Woolen and worsted cards, combs, gill boxes, drawing, and different systems of spinning are arranged with every facility for the student, and few mills can show a finer product than that from this department.

The weave room is equipped with a great variety of looms, besides dressing, beaming and other machinery, and into whatever mill the graduate might go, he would be quite sure to find looms with which he had worked at the school. A plain cotton loom, untakled, for the purpose of being drafted, is also used by the students to familiarize themselves with its construction, it being taken to pieces and set up again and used in other ways. Plain looms are represented by a number of machines, including the Northrop. As the pupil progresses, he is put upon more difficult work, including dress goods patterns, jacquard and leno weaving, etc. The hand loom department is a "gold mine" for the earnest student. He has his own loom, makes and weaves his own patterns, and those now in the looms reflect a great deal of credit upon the students who have had less than eight months' instruction. Mr. Nelson, the weaving instructor, is a genial, patient and painstaking man, who not only thoroughly understands the work, but is greatly interested in it, and his rooms are as clean and the work in process in such condition that one would think it the weave room of a factory in which each weaver fully understood his business and owned a share in the plant. The department of

chemistry and dyeing is also well fitted for this branch of the business. The lecture hall and class rooms are large, well arranged and provided with design charts, stereopticon apparatus and other appropriate furnishings. The machinery is driven by electric motors, placed under the ceiling on a line with the shafting, each department being operated independent of the others. Three floors of large dimensions in a centrally located building, with elevator service and corresponding conveniences, are utilized by the school. It is perhaps due more to the personal work and interest of Mr. Umpleby than to anyone else that the department of cloth structure and designs, of which he is the principal, has been brought to its present state of perfection. Mr. Umpleby unites the experience of many years of mill service with a good deal of technical college work, and besides being an expert photographer, designer and weaver, has other accomplishments which make his services of very great value to the school. He has introduced many improvements and systems to perfect the courses of study, and with Mr. Denniston, who has recently been engaged as his assistant, will no doubt be of increased usefulness to the school.

AMERICAN ECONOMY OF TIME.

When visiting the United States, Mr. Havelock Wilson was particularly impressed with the labor-saving machines in operation in the different factories, as well as with the order and method with which the works are conducted. In making a tour round one factory in Ohio, he was surprised to find above each machine a hugh placard, with the words, "The Hon. J. Havelock Wilson, M. P., from England." Asked why this notice was necessary, the manager said, "Oh, it is purely a business arrangement. By placing this notice in the works each man knows who is the visitor being conducted round, and does not need to ask his mates. Time is thus saved." Mr. Wilson also observed that the men were allowed to sit at their work. The manager said that was also a business matter. "We find that the men can do 15 per cent. more work seated than standing."

"I'm not pleased with your school report, Bobby," said his father, with a solemn look.

"I told the teacher you wouldn't be; but she was too stubborn to change it, the old pelican!"—*Tit-Bits.*

THE DISCOVERER OF SHODDY.

"Chaltrome" writes as follows: —If England's martial heroes have had monuments raised to their memory in our great National Cathedral on the ground that they won fields of battle and were responsible for heaps of slain, why should not Benjamin Law, a small trader of Batley, who in 1813 give his neighbors the benefit of his discovery that new cloth might be made out of old? And if it be true that a man who teaches his fellows how to produce two blades of grass where only one grew before is a benefactor, then also the man who enables a district to support ten times its number of inhabitants deserves the appellation. In 1813, when Benjamin Law made known his discovery, the population of the township was about 3,000; now it must have reached nearly 30,000; for at the last census (1891) it stood at 27,507. No one can travel through the district on the London and North-Western Railway without being impressed by the evidences of prosperity in the way of handsome mills and warehouses, residences, vilas, and substantial stone houses for operatives. These are the outward signs of industry and enterprise, and which takes its rise from the small shopkeeper whose name has been almost forgotten in the general prosperity.

Before Law's day, woolen garments, when they were considered to have done full service, were torn up into flock for stuffing furnitures and saddles, etc., and their last use was a manure for the land; but Law discovered that with a certain admixture of new wool, so as to form a basis of fibre, the old wool, when torn up, could be made into cloth, which not only had a commercial value, but was really cheap, useful, and presentable, and was thus a decided boon to those who wished to make their incomes go as far as possible. Shoddy has had a bad name, but injustly so; for when a man wants to say anything particularly disrespectful he often weaves the word into his remarks. This, however, arises from ignorance or prejudice, perhaps both; for in the use of shoddy man is only copying Nature, who never wastes anything. How clean she sweeps up all her refuse, washing

it down tidal rivers, which either make new lands on present sea-bottoms or lay down rich mud on warp lands at river mouths, which are ultimately reclaimed. All the refuse of fields, gardens, woods, and forests she scrupulously makes use of, transforming it by wondrous chemistry next year into wealth of foliage and flowers and fruits. And is there any reason why "second-hand" wool should not be used in combination with new, thus putting within the reach of the toiling millions garments they otherwise could not buy? There has been a distinct improvement in the clothing of the British workman since the days of corduroy and fustian, and shoddy and the sewing machine have had an appreciable effect in lengthening the average of human life in the United Kingdom.

PRESERVING.

Crimsonbeak—"My wife refers to the preserving season as stirring times."

Yeast—"Well, they're having stirring times in Cuba now. Do you suppose it is the preserving season?"

"Well, yes; they're trying to preserve the peace."—*Yonkers Statesman.*

A MEMORY.

He welcomed me with a smiling face;
He clasped my hand with a courtly grace;
Ah, me! He was of a well-known race.

His hall was a gem of its kind, to see;
His lackeys were just what they ought to be;
Ah, ha! But the world was fair to me.

With vintages rare my wine-cup flowed;
With a wondrous light mine host's eyes glowed;
Ah, me! But I cared not what I owed.

The wavelet's beat on the sounding shore;
The footstep's beat on the polished floor;
Ah, ha! And I beat, as ne'er before.

I made that summer hotel guy see,
A "Lord" from over the bounding sea.
La, la! But life is a cinch for me.

ORMSBY A. COURT.

WILLIAM E. GLADSTONE
And the Figure Nine.

Gladstone, nine letters; born Dec. 29, 1809; died May 19, 1898, —89=1809; years of age, 89. Nine days after his death was interred in Westminster Abbey, in the 98th year of the 19th century. In Gladstone there are nine letters denoting the year he was born.

Teacher: "You are painfully slow with figures, Tommy. Come, now, speak up quickly. If your father gave your mother a £10 note and a £5 note, what would she have?"

Tommy: "A fit."—*Tit-Bits.*

YOUR PORTRAIT WOVEN WHILE YOU WAIT.

The November issue of the Journal contained an account of the alleged to be marvelous invention by Jan Sczcepanik, of Vienna, that was "designed to revolutionize the silk weaver's art." It is claimed for this invention, that by utilizing photography for weaving purposes, Szczepanik can now, in a single quarter of an hour, accomplish what it has taken the designer months, or even years, to complete, according to the size of the design.

In Szczepanik's own statement, of what he proposes to do, he explains the nature of the photographic apparatus employed. As is known, a design that is to be woven must first be resolved into squares. Now, in the case of a large gobelin, the designer must fill up millions of such little squares before it is possible to puncture the pasteboard cards which are indispensable in the Jacquard loom. The Vienna inventor employs in his large photographing apparatus ruled screens containing the necessary intersections.

These screens or grids are on glass plates, prepared by photography, and are said to be the largest photographic negatives ever made, measuring 1.10 metres square. Each such screen contains a million squares, corresponding with those which hitherto the designer with infinite labor, has filled in, in the coure of possibly two or three years. Szczepanik proposes to photogragh any pattern that may be selected directly on the sensative plate.

Two minutes exposure, it is claimed, will suffice to produce an image on the sensitized paper showing the points of intersection needed in the Jacquard card. Bathing, developing and fixing will occupy a quarter of an hour more, and then the design is finished. The different colors that the web is to have are represented by different signs or figures (squares) which are produced by mans of corresponding stops in the objective.

Eventually the inventor expects to weave direct from the original design plate by means of electricity. This would, indeed, revolutionize the art of silk weaving, but some of the practical silk manu-

facturers who have turned this proposition of Szczepanik's over in their minds, are incredulous regarding its practicability. The young Vienna inventor says, that within a few weeks he expects to set up for experiments, an electric Jacquard loom, which, when perfected, will be exhibited at the Paris Exposition in 1900, for the first time. This loom will weave silk pocket handkerchiefs in public.

Within three minutes the purchaser of such a handkerchief will be photographed by an apparatus in the loom itself, the design plate will be prepared by the same machine, and in half an hour the purchaser will be able to take away a silk handkerchief with his own portrait woven into it.

Silk manufacturers in this country as well as abroad naturally look upon all alleged time-saving inventions with an economic interest, and men well versed in all of the practical details of silk fabrication, were called upon to examine the merits of the new process. Thus far they have not been of a character to inspire the utmost confidence.

Vice-President Lambert of the Silk Association, doubts the practical utility of Szcepanik's invention. He does not think it likely that the idea of replacing the individual designer with a photographic process, would find favor with the silk manufacturers in this country. The designer of silk patterns, he remarked, was something more than the maker of a picture. It was necessary that he should know all about the manufacture of silk, in order that he might be able to judge of the fitness of a design for any particular quality of silk. It was part of the silk designer's business to know how a design was going to work out in the fabric. "The mere making of a design," said Mr. Lambert, "is not the most important part of the art of weaving of silk."

Jacques Huber, of Schwarzenbach, Huber & Co., who have extensive mills, employing in all some five thousands hands in this country and in Europe, returned from a visit to Zurich not long ago, and in commenting on Szczepanik's invention, said: "The silk makers in Zurich pay little attention to it. It does not seem to be practicable. Of course, if there was anything in it designed to save time or lessen the expense of manufacture, the silk men would be quick to take it up. So far as my observations went, this invention excited very little talk in Europe, and certainly has not caused any stir among the owners of silk mills. Personally, I am not familiar with the process proposed by the Vienna inventor.

"If he is able to work out any practical improvement in present methods of silk manufacture, I shall be glad to take it up. Business is business, and the question at all times with a manufacturer is: Can you help me save anything, and if so, how much? If there is anything in the process put forward by Szczepanik, the silk manufacturers will jump at it quick enough."

Mr. Huber supplemented this expression of his views with the remark that he thought it would be ridiculous to try to do away with the weaver in the operation of a loom.—*From the American Silk Journal.*

A CURIOUS instance of a respect for property rights was displayed in the case of a rubber-tipped lead pencil which was left by accident in a telegraph office. The owner missed the pencil upon arriving home, but thought no more about the matter. A chance visit some twenty-four hours later to the same office discovered the pencil on the shelf on which it had been left, some good Samaritan having sharpened it. As the office is on a thoroughfare, it must have been visited by scores of patrons, all of whom left a most useful and sizeable little article unappropriated. That must have been *honesty day on the street.*

YOUR AFFECTIONATE SON.

A bullet-riddled army blouse was once returned to a desolate mother. Its owner had left his junior year in college, his high ambitions, his gentle ease, to fight the battles of his country, and had fallen almost among the very first of those who, like the heroes of Homer, were thereafter safe in immortal youth. In a pocket of that blood-stained garment the mother found a letter, on which the only legible lines were these: "If I die tomorrow on the battle field, as many a better man must, it will be in a good cause; and you, dearest mother, will have given our country all you had to give. Your affectionate son."

THERE is a beautiful custom in Denmark which, during the summer holidays, sends the school children of the cities to the country and those of the country to the cities. The parents of the country and of the cities swap children temporarily, so that the city children are strengthened and made happy in the country, while the people in the cities show their little visitors the sights and get up little festivals for them. In this way Copenhagan sends 10,000 school children to the country, and entertains the same number in exchange.

SIMPLE LESSONS IN PHOTOGRAPHY.

HOW TO MAKE A NEGATIVE.

Having mounted the camera on the tripod, and it is pointed towards some outdoor subject on which there is well marked light and shade. This may be the barn and stables, with the pony and carriage ready for a drive, or the view may be a house at no great distance, by preference one on which the sun is shining obliquely at the time. Should any sisters, cousins, or aunts, happen to be on the scene, no special harm will arise; only, as the first trial may not be all that is desired, it is wise to operate just at first under such circumstances, as to prevent unpleasant inquiries being made as to the measure of success obtained, and, if failure result, to bear one's sorrow in secret.

Back the lens or camera in or out until the inverted image of the object or view is seen clearly and sharply depicted upon the ground glass, the focussing screen of the camera.

Here, note the focussing screen has a twofold use; it enables the operator to see precisely the nature of the picture he is ultimately to obtain as a negative, for which purpose he must dodge in and out the legs of his tripod, or rotate the camera a little to one side or the other until he is satisfied with the pictoral effect. When thus composing a picture, it is well at first to do so without any stop or draphragm being inserted in the lens, as the greatest possible illumination, quite irrespective of sharpness, is here desirable.

The proper arrangement of the subject having been secured, next try and make the image as sharp as possible on the ground glass, which is the second function performed by the focussing screen.

It is quite possible that the image may be sharp in the centre, and fall away, in respect to definition, towards the sides. To rectify this, insert the largest draphragm and note the effect upon the image. One use of a draphragm, is to extend the range of sharpness from a near to a distant object. Should the first daphragm not give the marginal sharpness desired, then must each smaller in succession be tried until the sides are sufficiently well defined.

We now turn your attention to the plates: Having obtained a packet of gelatine plates, the suitable size for the camara, they must be brought in a room into which not the slightest vestige of white light finds admission. Let the light proceed from a lamp so carefully covered by deep ruby glass and post office paper as to render impossible any rays from it escaping into the room, except those transmitted through the colored screen.

The faintest white light falling upon the plates, even for an instant, will cause them to be rendered useless. Having opened the box or parcel, ascertain which is the ovated side of the plate, and place it in the holder gelatine or face side next to the slide, taking care to close slide and fasten. Of course this may be done at any time, even one or two weeks, or even months, anterior to the time of using the plates in the camera, but special care must be taken that the holders containing the sensitive plates be kept away from the light in the interval, because, no matter how closely fitting the various parts of the holder appear to be, it is not impossible that a little light may be admitted. The precaution of keeping each "loaded" holder in a black bag or an envelope of brown paper cannot be too strongly insisted upon.

It is in giving the exposure that the greatest errors will be perpetrated at first, and regarding this no rule exists.

If one second's exposure be given, the tyro will, upon developing the plate, ascertain whether this has been too much or too little by the kind of negative which results. The mere act of exposing is simple.

Having ascertained that the subject is focussed, place cap on lens, remove or open the focussing screen, and insert the plate in holder.

All is now ready for the exposure, the mechanical operation is simplicity itself.

1st, Draw the shutter or slide from plate holder.

2nd, Uncap lens for one second.

3rd, Replace cap on lens.

4th, Return slide or shutter into holder.

5th, Remove holder to

The Dark Room.

In some part of your house a closet can be found with a tight fitting door which will meet all your wants; the larger the better, for your ruby light and your breath will very soon destroy all the air for breathing purposes, a great fault with most rooms, even in large photographic establishments.

If you can build a room in some part of your house, and when build-

:ng provide for proper ventilation, it will well repay the little cost of the few boards needed. Make it six feet wide, ten feet high, and ten feet long, ventilate it by having made at the tinsmith's, four tubes shaped like the letter U, one end one half the length of the other; on the long end have a flange, cut two holes in the wall of the room at the bottom and two at the top, of size of the inside of the tube, and nail the tube by the flange to the wall so as to cover these holes, the tubes should be a foot one way by six inches the other. Paint them inside and outside a dark dead color to prevent reflections of light.

This simple and inexpensive method will add to your comfort on hot days and help to keep the air of your dark room pure, place the door of the room at one end, or as near one end as possible, unsing the end farthest from the door for changing the sensitive plates, and place around the room a good wide shelf at such a height that, when sitting on a chair, your knees will pass comfortably under it; on this shelf, at the side, you can place the plate holders when you wish to fill them; at the end you will have room for your developing operations. Place other shelves above as you may reach them, on which to place your bottles, dishes, and store your negatives, etc. If running water can be placed in the room you will be most fortunate.

It is assumed that you are not so fortunate, therefore we will describe a method to work without having such an arrangement. At the end of the room where developing is to be done, first settle on a place to fit the ruby lantern, the light by which all your work is now to be done. In front of the lantern an ordinary heavy sheet-iron pan, such as is used for baking, measuring about 16 inches long by 10 inches wide; this is to constitute your sink over which developing is to be done, and should be two or three inches deep. In the bottom of this pan have a piece of lead pipe soldered to carry the water entering it to a pail underneath the shelf. In this pan construct and place a wooden frame of your stripes of wood on which your developing tray can rest clear of any dirty sediment that may collect in the bottom of your little sink, next construct a shelf on your left, and within hand reach without leaving your seat; on this, place a pail which is to hold your supply of clean water; put in this pail a stop cock, and over the cock slip a piece of rubber tubing long enough to reach to your developing tray over your sink when in front of your ruby lantern.

Have the pail in which the clean water is kept a little smaller than the one into which the overflow passes; this precaution may prevent marring the ceiling below you.

Having arranged our room for its uses, we will now take up the subject of development.

ENGLISH AS AN AID TO INSANITY.

Under the above title, an anonymous writer in Demorest's Magazine has the following to say:

Imagine the construction of the English language. Perhaps you may be gazing at a number of vessels on the water, and exclaim, "See what a flock of ships?" You are at once told that a flock of ships is called a fleet, and that a fleet of sheep is called a flock. It might be added for your future guidance that flock of girls is called a bevy, while a bevy of wolves is called a pack; and a gangs of angels is called a host; but a host of porpoises is called a shoal, and a shoal of buffaloes is called a herd. Still a herd of children is called a troop, but a troop of partridges is called a covey; a covey of beauties is called a galaxy, while a galaxy of ruffians is called a horde; further, a horde of rubbish is called a heap, yet a heap of oxen is called a drove; a drove of blackguards is called a mob, and a mob of whales is called a school, and school of worshipers is called a congregation, while a congregation of engineers is called a corps; a corps of robbers is called a band, though a band of locusts is called a swarm, and a swarm of people is called a crowd; a crowd of pictures is called a collection but a collection of money is called a hoard, and a hoard of people is called a company; a company of ministers, however, is called an assembly, and an assembly of soldiers is called a muster. "Stop, stop!" methinks I hear you cry, "I cannot remember half of it."

THE WEB OF LIFE.

My life, which was so straight and plain,
Has now become a tangled skein,
 Yet, God still holds the thread,
Weave as I may, his hand doeth guide
The shuttle's course, however wide,
 The chain in woof be wed.

One weary night, when years went by,
I plied my loom with tear and sigh
 In grief announced untold,
But when at last the morning's light
Broke on my vision, pure and bright
 There gleamed a cloth of gold.

And now, I never lose my trust,
Weave as I may, and weave I must,
 That God doth hold the thread,
He guides my shuttle on his way,
He makes complete my task each day;
 What more then, can be said?

MRS. BLOOMFIELD MOORE.

THE HAND LOOM.

By FENWICK UMPLEBY.

During the last few weeks, I have heard many remarks about the hand loom. You may not be aware that there are many fabrics at the present time, woven on the hand loom. There are many districts in different parts of Europe, where the people gain their livelihood by weaving on the hand loom.

Although the hand loom has been largely supplanted by the power loom, it still holds a very important place in the designing department of many large mills. As it is so very simple in construction, it can very easily be changed to suit the requirements of the designer, in the weaving of nearly any kind of woven fabrics. If for instance, a change had to be made in the number of picks per inch, or in the method of interweaving the various shades of filling. The hand loom weaver has his filling motion and box motion under perfect control. and can, without any alteration of any of the different parts of the loom, change the number of picks and alter the mode of weaving in of his various colors.

For this simple reason it is preferable to the power loom. Changes in the power loom are sometimes very difficult to make. Take instance just quoted, where a change of filling had to be made, either in the number of picks or in the method of introducing the different kinds of filling, it would necessitate either the building of a new chain or a fresh set of lags, or a different set of cards for the box motion, also require the hunting up of a fresh gear for the filling motion, and probably one of the proper number could not be found. Whereas, if the hand loom weaver wished to make these changes, the action is father of the thought, he wishes to increase from 26 to 30, and in goes the 30 picks. There are many more advantages in making pattern ranges on this loom. For figured fabrics where a complicated order of filling is introduced, the hand loom is always preferable; the designer can readily make the loom answer his requirements. Hence, in many mills of note, the hand loom is employed in the weaving of pattern ranges.

To the student of textile design,

the hand loom is specially useful, for he can at once put his ideas into a practicable shape. You must be aware that it is quite as necessary and important in the study of textile design as in any other branch of science, to experiment and work out different problems. It is very inconvenient to have a power loom in his study or workshop, therefore, I would advise him to procure a hand loom.

There is no advantage in having a loom to work on the same principle as a sewing machine, the mechanism of the parts which require changing the most are too complicated, the less changing of gears and going parts, the better for the student.

The principal motions in weaving, common to both hand and power looms are five in number namely, shedding, picking, beating up or wefting, take up, letting off. The shedding motion is probably the most important, both in hand and power, it divides the warp threads into two sections, sometimes elevating one section while the other remains stationary, and at other times elevating one section and depressing the others. The picking motion is the one which impels the shuttle from one side of the loom to the other. The take up motion winds the cloth on to the cloth beam as it is woven. The wefting or beating up motion is the going part which hold the reed and shuttle boxes and beats in the filling as it is put in by the shuttle. The let off motion is the appliance attached to the warp or yarn beam, to let off such yarn as may be required for the filling, to turn up the whole.

The shedding motion effects a division of the warp, for the shuttle to pass through, carrying the filling impelled by the picking motion. The going part beats in the filling just put in by the shuttle. The take up, winding on to cloth beam the amount of cloth woven, while the let off motion delivers more warp ready for the filling.

The hand loom is of simple construction, consisting of a wooden frame, of four upright posts joined at each side, and also at the back by a lower and upper rail, in front by the breast beam over which the cloth passes to the cloth beam, then there is the all imporportant going part or baten, which is made up as follows: The rock tree on which it swings the swords or upright arms on which the whole going part oscillates, the race on which the shuttle runs from boxes placed at each side.

When you have faults do not fear to abandon them.

THE LOWELL TEXTILE JOURNAL.

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid $1.00
Single Copies 10
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the twenty-fifth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

Textile Schools create a desire for scientific knowledge, and they are essentials for the well being and prosperity of the people.

. . .

Last year, 152 cotton gins were made by the Japanese and sent by steamer into Shashih, China.

. . .

Batley, England, has about 35,000 inhabitants, but they have a textile school with 1,060 class students, and had it not been for the County Council's restricting students to two subjects, the number of class students would have been considerably larger.

The mind of the future textile manufacturer must be based upon:

1st, Perfect knowledge of the experience gained in the past.

2nd, The inquiring faculty which is constantly asking the question, Why?

3rd. The mental aptitude, strength, and inclination to conceive clearly.

4th, The physical strength and character to carry into effect—?

. . .

Silence may be golden, or it may be of lead. It may be the silence of wisdom and self mastery, or it may be the silence of stupidity and cowardice.

. . .

Keeping bad company is one way of sending the devil an invitation to visit you.

. . .

The boys say there is only one Mann in the Lowell Textile School that can play foot ball.

. . .

The war with Spain is over. We must now buckle on the armor of energy, ingentity and prowess, and fight the difficult times. This is not a time for croaking and throwing up the sponge.

In Venezuela there is nothing that can strictly be called a manufacturing industry.

. . .

Yet, for the exportation of Venezuelan produce, they require about 7,000,000 bags.

. . .

Whatever is done in the country, requires material that is only obtained from abroad.

. . .

The printing establishments have to import their paper. There is a small mill in Valencia, making the cotton stuff for the small sandals used in the country, but the raw cotton is imported.

. . .

Foot ball has too many risks, and it is just the game to take revenge and beg pardon.

. . .

The evening classes at the Textile School are well attended, the interest taken by the students is very gratifying to the instructors.

. . .

Why are there not more ladies in the Art Department? This department is the most interesting in the Textile School.

. . .

Mathew C. Cuttle's father dyed the first piece of Clay Worsted.

Mr. M. C. Cuttle is the boss dyer at the Shaw Knit Company, Lowell, Mass.

. . .

The Clay diagonals are made in Huddersfield, England, and the name has become generic. Clay diagonals are made in this country and are sold much cheaper than those made in England and perhaps that is why the firm of Clays have asked this government to place an injunction upon them. There is a cotton Clay diagonal which is made in Bradford, England, which ought to be debarred; but the American goods are honest goods and worsted cloth. *Morning Citizen.*

RATHER RISK IT.

Loud-Voiced Sergeant—"Now, Macpherson—you long-haired, raw-boned, fog-featured scarecrow, eyes right! Be smart, you dunderhead, and if you're not shot, you'll be a soldier one day like me."

Macpherson—"Like you, Sergeant? 'Deed, ye make me long for the risks of battle."—*Tit-Bits.*

PHOTOGRAPHING NATURE'S COLORS.

Professor Gabriel Lipmann, at a recent meeting of the Royal Photographic Society, described his system of color photography, whereby a photograph showing the colors of nature is obtained by a direct process and with one exposure of the plate. The film, which might be of any sensitive substance, he explained, was exposed, developed, and fixed in the usual way. The film must, in the first place, be transparent and grainless, and, in the second, it must be in contact with a metallic mirror, which was formed by running a layer of mercury in behind the plate, was to reflect the incident colored rays and thus make the incident light waves stationary. These stationary vibrations, falling in the interior of the sensitive film, impressed their own structure upon it, and by virtue of the structure thus imparted to it the ground deposit of silver when viewed by reflected white light, appeared clothed with the same colorsas were possessed by the image in the camara. The colors were produced by "interference," in the same way as those of the soap-bubble or mother-of-pearl. That this was their cause, M. Lippmann said, was proved by the fact that the tints of a negative changed if it were damped, in consequence of the gelatine swelling slightly, and thus altering the structure of the silver deposit. The colors produced by this process were true and bright, provided that exposure and development had been properly conducted; they were, moreover, completely fixed, and resisted the action of light and time. He had not yet succeeded in taking prints from his negatives, but was convinced that to do so would be found possible. In the course of the lecture a number of the results achieved by Mr. Lippmann were exhibited in the lantern, including colored photographs of the spectrum, stained glass, landscapes, fruit and flowers, and the portrait of a little girl. A reproduction of the spectrum of argon showed the characteristic lines of that gas in the most beautiful and distinct manner.

We regret to hear of the sad accident to Professor Nelson. We tender our condolence and hope for a speedy recovery.

CHOICE OF OCCUPATION.

Every year in thousands of families, as the boys attain the age when they are supposed to have finished their school education, the important question arises. What shall be the future occupation of the boy? The question is not so easily answered, and whenever the choice of occupation has been made without full consideration, it is too often found that the selection has been made without reference to the physical and mental fitness of the boy for the chosen field. The wish of the boy is very seldom consulted, and though young yet and without mature experience, it seems but fair that his preferences should be taken into respectful consideration. Parents frequently make the mistake at this important juncture of choosing occupations for their boys for which the boys' physical system is ill adapted. Weakly boys with narrow chests should never be put at indoor occupations. Some trade that will keep them in the open air is better suited for such. Then, again, too many parents look upon all trades as something beneath them, and erroneously teach their boys that it is more respectable to enter one of the professions or even to go into clerking for a livelihood. All mechanical trades need to be recruited from the intelligent classes, and the condition of mechanics can only be elevated when accessions to their ranks come from well educated, respectable, honest, self-respecting people. Too many boys are annually consigned to other occupations, for which they are not fitted, to the great damage of themselves and of society, and in which, after a long and one-sided struggle for mere existence, which is getting year by year more and more precarious and difficult, they are finally left a stranded wreck, with the consciousness that the mistake in choosing their occupation has been the main cause of their misery and distress.

Most of this is due to the false pride and prejudice against a mechanical trade, which would have offered a good field for the wrecked boy by intelligence, industry, and perseverance to have become a man able to support himself and family, and useful to society. Who can

doubt the truth of this? If we look about us, we cannot fail to see that in all occupations the standards of requirements have been raised, and particularly in those employments which are not included in the mechanical branches much more is now expected from applicants for positions than formerly. Look at the increasing numbers of those who are studying for the law, the ministry, or the medical profession. Count the numbers of doctors, lawyers, and ministers who can barely eke out an existence. Scrutinize the advertising columns of any of our newspapers and see the overwhelming numbers of those who seek employment, having nothing to offer but willing hands and feet, ordinary intelligenge, and very little education. Just look at the army of clerks and so-called bookkeepers constantly offering their services; indeed, it would be more truthful to say begging for employment at anything that offers. These are the direct consequences of an overcrowding in those employments which do not require knowledge of any mechanical trade. It is not so bad where these boys have parents with means who can help them, but when they have nothing but what they can earn, it would be well if our cry of alarm were heeded and false pride and prejudice were made to give way to the true interests of the boy.

On the other hand, see how intelligent, well trained mechanics progress. It is not necessary here to cite examples of living men, who, after having thoroughly learned a mechanical trade, have by industry, economy, brains, and force of character lifted themselves into enviable positions of business, success, honor, trust, and wealth. There are plenty who, from small beginnings, have attained success. All work is honorable and enobling, and those who, probably being idlers themselves, profess to look upon the mechanic with disdain, and would, if they could, deny him equal rights, should remember that idlers are always superfluous in this world's economy, but that the good mechanic is constantly in demand, as he is the one who lays the real foundation of all business success, and that his industry is an absolute necessity to the capitalists. If these people who turn up their noses at the mechanic allege as a reason for their exclusiveness that the mechanic is lacking in refinement, they should be told that it is partly due to the fact that those who deem themselves more refined have scrupulously withdrawn their refining influences from the mechanic by not associ-

ating with him. But the mechanic is not excluded from true culture, and one can find as many true gentlemen of culture and refinement among mechanics as among the so-called professional classes, indeed often one searches in vain for refinement among the latter.

Much depends upon the quality of the material which enters the mechanical trades, and if many of those who now make the mistake of studying an unprofitable profession should learn a trade instead and determine to lead a refined life, it will not be long before even this somewhat imaginary reproach is taken away. It is not necessary either to go from one extreme to the other, and that all should rush into the trades, nor that the other great mistake be made of thinking that one mechanical trade is more honorable than another and that every boy must pick out what seems to him as a little more elevated a trade. We plead for the proper training of boys in the mechanical trades, for their thoroughly mastering the whole trade and not one branch of it. All mechanical trades offer a good livelihood, steady employment, and fortune for those who have the patience, perseverance, and industry to find it. Learn a trade! In this connection we may say that the question why boys do not properly and thoroughly learn a trade in these days has been partly answered by an old employer, who gives what, in his opinion, are the reasons. He says that boys nowadays are different from what they were when he was a boy. In those good old times they came to learn as much as possible, now to earn all the money they can. Then apprentices were the children of comparatively well-to-do people, who took pains to bring their children up properly and were more solicitous, by having their sons properly instructed and by making good mechanics of them, to make them independent of the world. Now apprentices come mostly from the poorer classes and are expected to bring as much wages home as possible, so as to help support the family. They only look for the immediate present, regardless of the future. The first question an apprentice asks is how much he is to get a week; he thinks only of his earning capacity and not of the time it takes to instruct him, nor of the materials he spoils. The next question generally is, what hours he will have to work.

Then again in the olden time the master or foreman generally helped his instruction along by an occasional whipping, and many a good master workman today gratefully remembers the wholesome

chastisement that made a man of him. Those days are passed, and So'omon's wise saying that he who spares the rod spoils the child is forgotten. The result is that employers now endeavor only to get as much work out of boys as they can, and take no interest in teaching them anything; in fact, boys in workshops nowadays are looked upon as so many necessary evils. When the employer ceases to be looked upon and respected as a teacher and educator, and only as an employer, there is an end of any hope for proper instruction of boys in any mechanical trade.

ART OF HARMONISING COLORS.

This, it would seem few people recognize, and now that yellow is the mode, we shall find many wearing it who should most carefully avoid it, for it is singularly unbecoming to those it does not suit, developing the worst shadows in the face. Nevertheless yellow tulle bows, lisse jabots, yellow artificial flowers and yellow trimmings to hats and toques are flooding the market. No one can all their life through be faithful to one particular shade; green is in later life becoming to those who could not wear it in youth, while pinks and light blues, so suitable to young faces, are anything but advisable as the years go on. Peach is a faithful color that can be worn in middle life, almost as well as by a girl in her teens. Older women are apt to fall back upon black with a far too faithful persistance. It always wants softening towards the face, and the introduction of a bright color renders it most becoming. For the moment, black would seem to be the ground work for nearly all colors in material and millinery.

HIS LEG BROKEN.

In the game of foot ball at Atherton, Saturday, November 12, 1898, between the Zions and a picked team from Walsh's Mills, William Nelson, professor in the weaving department at the Lowell Textile School, got his leg broken

The game was half over, and was rough, owing to the unacquaintance of some with the English game, under which rules the contest was conducted.

Mr. Nelson, who played with the Zions, collided with Thomas Staveley, and when examination followed the fall, it was found that the injury was serious, as above stated. Mr. Nelson was taken to Dr. Jackson's house and then home.

MASSACHUSETTS CHARITABLE MECHANIC ASSOCIATION

TWENTIETH TRIENNIAL EXHIBITION

The Mechanics' fair, which is now in full blast, presents a very creditable array of exhibits, but it shows no marked improvement over the exhibitions of former years. In the city of Boston and the surrounding manufacturing cities and towns, there ought to be sufficient material for an exhibition greatly superior to the present show. What is wanted is a fair exhibit of the manufacturing products of the state of Massachusetts. Few novelties are presented; from exhibition to exhibition we notice practically the same feature in the exhibits, steam engines and accessories, electric lighting apparatus, wood, iron and leather working machinery. But of the products from our large machine shops for the working of textile fibres there is little to be seen. Massachusetts is a manufacturing state, in every sense of the word. Cotton, woolen and linen fabrics are manufactured in large quantities, the machinery to work these textiles is made in the state. The Mechanics' fair could be made into one of the most interesting and instructive exhibitions in the United States of America.

Among the noted exhibits of textiles and textile fibres may be mentioned: The Barbour Bros. Co., 226 Devonshire street, Boston. The exhibit of the Barbour Bros. Flax Spinning Company will prove of great interest to all visitor. A complete line of the standard Irish flax products is shown; also thread for the use of tailors, glove makers, bookbinders, sewing shoes, harnesses, and all leather work, for carpet sewing and all home purposes. The flax is shown too,in different stages of manufacture. In addition to this, and of especial interest to ladies, is the fine exhibit of needlework, representing every class, from the most delicate needle point laces to rich, heavy embroideries in rope lines floss. Last, but surely not least, is the lace-maker, who sits deftly crossing and twisting her bobbins as she weaves the real lines torchon lace, an art just coming to be understood and popular in this country.

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Latest Improvements and Specialties.

IMPORTERS AND BUILDERS OF
COTTON, WOOLEN, and WORSTED MACHINERY
CARD CLOTHING,
EGYPTIAN COTTON, Etc.

The Ballard Vale mills exhibits a loom weaving silk warp flannels, and also show a line of their regular products.

The Bogigian Co. 22 Beacon street, Boston. This exhibit consists of the manufacture and display of Oriental rugs in variety.

The Chemnitz Co., of Providence, R. I., demonstrate the process of making men's and children's fine cotton, cashmere, and silk hosiery in all colors.

Hodges Fibre Carpet Co., have a large display of fibre carpets, rugs, art squares, portieres, etc.

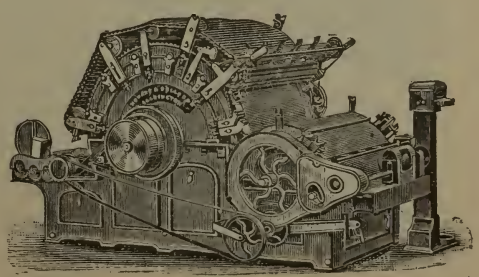
Hygienic Fleeced Underwear Co., Philadelphia, Pa., have a very fine display of their celebrated underwear.

Knitted Mattress Co., Canton Junction, Mass., a general exhibit of patented knitted fabrics.

Paterson Ribbon Co., Paterson, N. J. This is one of the most interesting displays to those interested in weaving and silk manufacture. The process of weaving, as demonstrated at this exhibit, is rapid and unerring, the finished product being remarkably even and almost flawless.

Josiah Harriman, 175 Hale street, Lowell, Mass., an exhibit of elastic and non-elastic webs and braids, also emblematic and embroidered suspenders. These goods are made on the Crompton and Knowles improved suspender loom with special attachments for overshot work.

STUDY
the points of our different machines and compare with others.
UNDERSTAND
the merits and you will be convinced beyond a doubt of their superiority.
HOWARD & BULLOUGH
American Machine Co., Ltd., Pawtucket, R. I.



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MEALS AT ALL HOURS.

We sell a Commutation Ticket which enables a person to obtain board at a very reasonable rate.

THE FACTORY BELL.

When to the factory first he went
To be a laddie minder,
At once he fell in love with Liz,
The little bobbin-winder.
He was a gall nt little man,
And always carried her breakfast can,
As hand in hand each morn they ran,
When the factory bells were tolling.

When they grew up, and she became
A weaver, he a spinner,
He loved her still, and daily found
New charms and graces in her.
Pure was her soul, her conscience clean,
Amidst the dirt, the dust, the din,
And all which defiles without within,
Where the factory bells are tolling.

Dear then the the loitering, homeward walk
From work, 'neath bright stars shining;
Her sweet face wrapped in cosy shawl,
His arm around her twining.
What voiceless rapture theirs, I wis,
The trembling sigh, the lingering kiss
While all night long came dreams of bliss,
Till the morning bells 'gan tolling.

When they two wed, so scant their means
'T would almost shame the telling;
But rainbowed youth and bliss were theirs,
And love lit up the dwelling
And never beat hearts more proudly glad
Than theirs when first their own wee lad
Ran toddling forth to meet his dad
When the dinner bells were tolling.

Good fortune came to them, and now
He is a factory owner;
While Liz has silks and jewels rare,
And servant to cap and gown her.
With horse and groom they now appear,
Their 'cake is baked,' their prospects clear;
And they smile content as they sit and hear
Their factory bell a-tolling.

But never come to their brand new hall,
With its doll, decorous splendor,
Such hours of radiant rapture, or
Such moments sweetly tender,
As that lad and lassie used to know
In those dear old twilights long ago,
When home through the fields they wandered slow
As the factory bells ceased tolling.

T. W. COLLETT



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Acids, Dyewoods, Chemicals,

Drugs, and Dyestuffs Generally.

38 to 44 MIDDLE STREET. LOWELL, MASS.

EVER and anon, there is an outhurst of statistics regarding women in some quarters of the globe, and rarely does it fail that some writers take the tables and makes of them a test as to the disparity of the sexes. Astonishment is expressed that, notwithstanding all the hue and cry about the tremendous preponderance of women in the older countries, an analysis of the tables show that it is the greater longevity which produces this excess of women, and that as a matter of fact, up to forty-five the men are either in excess or the sexes are equal in number. If elderly and old women should die off as quickly as their contemporaries among men, such phrases as superfluous women would never have been invented. The latest published statistics are those of Germany, and it is interesting to observe that between the ages of twenty-one and forty-five there are 3,141,352 men and only 2,557,956 women, a proponderance of marriageable men reaching to nearly 584,000. After sixty years the men number but 1,796,334, while the women rise to 2,148,308. Similar results have been reached by analysis of statistics relating to the population of Great Britain and the United States. Such statements ought to allay any apprehension as to the inability of girls to attain matrimony in consequence of a scarcity of men.—*From Vogue.*



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J. POWELL

PHOTOGRAPHER

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OUR SPECIALTIES,

Bromide Crayon and Pastel Work.

We are Unexcelled in Children's Photos.

Crayons .. Sepias .. Water Colors .. Pastels
LOTHROP & CUNNINGHAM'S STUDIO
182 Merrimack Street. LOWELL, MASS.

EDWARD AUSTIN'S GIFTS BY HIS WILL.

The late Edward Austin of this city gave, according to his will, which was filed for probate in the Suffolk Probate office yesterday, $1,100,000 in public bequests. The aged poor, the struggling student and teacher are made the objects of his great bounty.

Harvard College will receive $500,000 and the Massachusetts Institute of Technology $400,000.

The gifts announced in the will are as follows:

To the New England Trust Company, $100,000 in trust. The income is to be paid "to needy aged men and women who had been in better circumstances in early life, but had become in want when in old age."

To Harvard College, $500,000. The interest is to be applied "to needy, meritorious students and teachers to assist them in the payment of their studies."

To the Massachusetts Institute of Technology, $400,000.

To Radcliffe College, $30,000.

To Roanoke College, $30,000.

To Tuskegee Normal and Industrial School, $30,000.

To the Bacteriological Laboratory of the Harvard Medical School, $10,000.

The gifts to the Institute of Technology, Radcliffe College, Roanoke College and the Tuskegee School are given under the same conditions as the bequest to Harvard College. The interest is to be used to help needy students.

The will also contains some personal bequests. The Executors and Trustees named are William

Merrimack House
W. H BOODY, Manager.
W. E. CARLTON, Clerk.
MONUMENT SQUARE. LOWELL, MASS.

SAMUEL H. THOMPSON, President. ELISHA J. NEAL, Treasurer.

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Importers, Manufacturers, and Dealers in

MILL SUPPLIES, TOOLS AND METALS.

All kinds of Hardware and Builders' Supplies.

254 and 256 Merrimack St., Lowell, Mass.

Austin Wadsworth, Daniel R. Whitney and Edward W. Hooper. The will was executed Sept. 23, 1897.

Mr. Austin died at his home, 45 Beacon street, this city, on Wednesday, November 16.

Born in 1803, he was sent at the age of 18 to the far east as supercargo, and later became associated with his brothers, Samuel and William, in establishing a firm that was noted in China and the East India trade. After the death of his brothers in 1859 and 1865 he retired from active business and devoted his attention to benevolence, founding the present Law School at Harvard University, Austin Hall, and giving freely to many other educational and charitable institutions.

Mr. Austin was descended from one of the oldest Boston families, being a son of Samuel Austin, a highly respected merchant contemporary with John Hancock and all the leading men of ante-revolution days, and active with them in the patriot cause. His eldest nephew, Charles Lewis Austin, is the present representative of the family name.

It was pleasant news that President Crafts of the Massachusetts Institute of Technology received last evening in the report that the will of Edward Austin contained, among other items, a gift of $400,000 for Technology.

"We had learned from some intimate friends of Mr. Austin that he was very kindly disposed toward us, in fact that he intended to make the institute a gift in his will," said President Crafts, "but no one knew anything definite concerning his intentions, and I am very much surprised at the large size of the figures.

Have your Visiting Cards Engraved at

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The Correct Styles, the Lowest Prices

79 Merrimack and 15 John Streets.

TEAGUE & TEAGUE,
A NEW STORE
Therefore, the Latest Styles in
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Look us over . . . Cor. Central and Middle Sts.

LEGAULT & CO.,
Leading Jewellers in
DIAMONDS, WATCHES and RINGS
70 Central Street, cor. Prescott.

"The friends of the institution have been very generous in the last year and a half, and we have received about $800,000 since the spring of 1897. Still we are poor, and must remain so for some time to come. The expenses of a technical school are much more than those of most other institutions, and with one-third the number of students of Harvard we have only a small fraction of Harvard's income to work with. However, considering the age of the school, we are doing pretty well." —*Boston Journal.*

A NEW DOFFING MACHINE FOR THE SPINNING FRAME.

A new labor-saving machine for greatly facilitating the troublesome and complex process of doffing the bobbins from flyer spinning frames is now in operation in the factory of Mr. Robert Clough, at Ingrow. It is the invention of Mr. Percy Clough, by whom the principle was thought out nearly five years ago, and who has in the interval which has since elapsed been engaged in developing the original idea and overcoming mechanical difficulties. Before attempting to lay before our readers the leading features of this ingenious contrivance, it is necessary to remind them of the numerous manipulations of the half-timers usually employed as doffers. It is hardly necessary to recapitulate

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HAIR DRESSING AND MANICURING,
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TAKE ELEVATOR.

these movements in a district where they are familiar to so large a proportion of the population. But in carrying on the usual hand process they have, as a matter of course, to be repeated consecutively for each separate spindle. The mechanical doffer invented by Mr. Percy Clough (which has been made and fitted up by Messrs. Prince, Smith & Son, of Keighley) performs the equivalent of all these motions once only, and simultaneously affects every spindle on the same side of the frame. To begin with, the flyers are simultaneously unscrewed from the spindles by means of worms which engage with worm wheels fixed on the lower part of the spindles. These worms are carried on a shaft extending the whole length of the frame, and are so arranged that all the worms can be put in or out of gear with the worm wheels at the same instant. The shaft is turned with the hand by means of a hand wheel at one end. The flyers are prevented from revolving by a stopper which is brought up against one of their legs. By these means the spindles are turned, while the flyers remain stationary until the latter are free from the screws of the spindles. In front of the frame, supported by chains attached to pulleys upon a shaft carried by the frame itself, is the receptacle or tray for the full

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Crown and Bridge Work
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bobbins. This receptacle or box is about five inches wide and four inches deep, and extends from one end of the frame to the other. It can be brought down in front of the spindles or be raised high above the operators' head at will. This box is not only a receptacle for full bobbins, but also carries an apparatus for simultaneously lifting up the flyers, holders for supplying empty bobbins to all the spindles at the same moment, guides for guiding the thread on to the empty bobbins, and a cutting motion for severing the threads at one stroke. Thus the box is drawn down to a position opposite the flyers, and a series of arms are turned towards the spindles, and these arms clasp the flyers. The box is now lifted, carrying the flyers to such a position that the full bobbin can come off and the empty one go on. The lifter plate is further raised by an extension of the ordinary lifter motion until the full bobbins are almost clear of the spindles. The lifter plate is then tilted, and the full bobbins fall into the box. The empty bobbins are now simultaneously placed on the spindles by means of the apparatus before mentioned. The box is then lowered, carrying the flyers down on to the spindles. By means of the worms the flyers are screwed on to the spindles, and are then made to revolve until a few turns of the thread are wound from the full bobbins on to the empty bobbins. The threads are now cut at one stroke of the cutting apparatus, the worms are taken out of gear, the box and its accessories are lifted up out of the way, and the frame is now ready to restart. These complicated processes take some time to describe, but the succession is so rapid as to appear all but simultaneous, and the machinery when in motion works so smoothly as to convey to the spectator's mind a delusive impression of simplicity. We may add that the invention is now past the experimental stage, and that more than forty machines are now working at Grove Mill.

"Ma, may I go out to play?'

"No; you must sit still where you are."

Pause.

"Ma, may I go down into the kitchen?"

"No; I want you to sit perfectly quiet."

Pause.

"Ma, mayn't I sit on the floor and play marbles?"

"I have told you twice that I want you to sit just where you are and be quiet, and I mean exactly what I say."

Pause.

"Ma, may I grow?"—*Tit-Bits.*

STUDENTS FROM THE SOUTHERN STATES WHO HAVE ATTENDED THE LOWELL TEXTILE SCHOOL.



THOS. E. MITCHELL,
MOBILE, ALA.

W. B. COLE,
ROCKINGHAM, N. C.

J. P. LEACH, Jr.,
LITTLETON, N. C.

I. W. McALISTER,
ASHEBORO, N. C.

C. W. WAINWRIGHT,
STONEWALL, MISS.

Lowell Textile Journal

THE EVOLUTION OF A COLOR NOMENCLATURE BASED ON SPECTRUM STANDARDS.

By MILTON BRADLEY, - - - - Springfield, Mass.

Miss Elizabeth Peabody, returning to her native New England in 1868, after a visit to Germany for the purpose of learning exactly what a Kindergarten was, gave America its first real impulse toward an adequate and reasonable system of infant training.

The Kindergarten had been brought over to this country and experimental classes had been started in several localities, but these did not satisfy Miss Peabody's idea of what the new movement ought to produce. She had studied Froebel to such purpose that she was convinced that there was much more merit in his system than his few followers in this country had ever dreamed of. She therefore visited Germany for the purpose of thoroughly investigating the Kindergarten in the land of its birth; and after spending some months there she came home so filled with the subject that she could not refrain from spreading the good news of the Kindergarten in true missionary spirit throughout America. Her enthusiastic presentation of the new principles began to awaken in American educators a desire for better methods in the most elementary instruction, child culture or "child-gardening," as Froebel called it.

Among the material things selected by Froebel with which to interest and instruct his pupils, were various colored worsteds and papers, and when his system was brought to this country samples of the German materials were imported and used in the earliest Kindergartens here. At first, without much thought, our teachers supposed the special colors possessed peculiar merit, but it was not long before they began to crit-

icise them, and the American manufacturers who had already commenced to make Kindergarten supplies, were urged to multiply and improve the colors employed in the papers and other material.

Numerous calls for new colors and conflicting opinions as to those best suited to train the infant color sense raised discussion which finally led to a system of primary color education, which has since developed into a complete course of color study. However imperfect in its original conception and earliest form this may have been, it insured the ultimate analysis of color and the establishment of a language by which color can be recorded with the same definiteness with which music is written. Indeed, there has been developed a striking similarity between the notation and basis for written music and the nomenclature for colors.

It is now well known that the character of sound tones depends upon the length and rapidity of the waves produced by the vibrations of material substances, and it is equally true that colors may be definitely named and recorded as sounds are, because they also are determined by a physical quality called "wave length," by which the impression of color is conveyed to our eyes.

Many years ago important discoveries were made by which it became possible to record musical compositions, and thus we have written music, one of the most enjoyable blessings of our civilization. But until a very recent date there have been no terms in which to accurately express color, no means of naming the almost infinite variety of colors which surround us on every side, both in the works of nature and in the arts. Hence it has been impossible heretofore to make a record of any color for transmission to a distant place or for the use of a future generation.

The only resource heretofore available has been a material sample showing the color required, and even this has not been of permanent value, because time will change almost any color beyond recognition.

Because of these conditions there has been but little advance in the arts dependent on color compositions. In fact, if we are to believe some art critics, it is true that there has been no progress since the days of the so-called "old masters." But this can be neither proven nor competently denied, inasmuch as it is impossible to determine, with any approach to truth, what colors were used by those painters of the olden time, so entirely have their works changed by exposure.

Strange as it may seem, the discussions which arose between our early Kindergarteners and the manufacturers of their material, regarding the choice of color standards, on which to base their instruction, has resulted in the developement of an original and practical system of color nomenclature founded on the physics of color, and by which we may accurately name all the colors about us, in our gay clothing, our house furnishings and our art decorations, as well as the colors which Nature flings so profusely before our eyes. This system may be classified between the pure science of color, wrought out by means of the spectroscope with its wonderful revelations, and the practical application of color combinations in the arts and industries, as embodied in the use of the artist's pigments and the manufacturer's dyes.

The indefinite and incorrect use of words relating to color which has heretofore existed in popular literature, our reviews and miscellaneous writings is surely occasioned by the lack of a generally accepted color nomenclature. Referring to this same want, but speaking from a dffferent standpoint, Sir Joshua Reynolds has said: "It has been the fate of arts to be enveloped in mysterious and incomprehensible language;" and again, "If in order to be intelligible I appear to degrade art by bringing her down from the visionary situation in the clouds, it is only to give her a more solid mansion upon the earth."

Our best educators have keenly felt the great necessity for a vocabulary of color, based on definitely established standards, somewhat as geometry is founded on form study and is dependent on the measurement of right lines and angles.

Professor Church of the Royal Academy of Arts, London, in a valuable handbook entitled "Color, an Elementary Manual for Students," says among many tersely expressed truths: "The dearth of well defined color names in English and the want of flexibility in the English language as to the coinage of new designations, makes the question of color nomenclature a most difficult one." And again the same writer, after commending and criticising in a very impartial way the results of such experiments and the opinions of writers of repute as he was familiar with, says: "But to name tints, hues and shades instead of merely numbering them, constitutes a step in the right direction. Till an International Standard Color Conference of artists and scientists has finally agreed upon the names to be given to a couple of hundred different

hues, reproduced in enamel and preserved for reference, like our standards of weight and measure, we must be grateful for any attempt in the way of a consistent and complete nomenclature.

The tertiaries described by Chevreul, Hay, Field, Radgrave and a host of other writers on Color in its relation to art and industry, are nothing more than dull tones or broken tones of their so-called primary and secondary colors."

Although our scientists have regretted the lack of a color nomenclature, all their suggestions for improvement have been too abstruse for popular acceptance; and yet they have been unanimous in the opinion that in some way the wave length of a color must furnish its name, as there is no other measurable constant quality. But if we are to have an alphabet of color and a language of color based on this series of constants in the alphabet, the language must not be too complicated, but must be simple enough in its more elementary forms to serve a popular purpose.

Newton took the first successful step in this direction when he selected his seven colors in the rainbow as types or standards. But he believed the intermediate colors between his standards were produced by the blending or the mixing of the two adjacent colors. Brewster at a much later day supposed that he had discovered a great truth in his belief that there were only three colors, which were primary, and that from these all colors could be made. Neither Newton nor Brewster recognized the truth that each color has its own individual, definitely indicated physical quality called its wave length.

No substantial results toward perfecting a popular language of material colors were achieved until the phenomena observed by Newton in his color top were rendered of practical value by Clerk Maxwell when he conceived of the slitted color disks. These devices made a notable advance in the study of color and became a valuable feature in the analysis of color effects and the production of a color nomenclature. But the system still lacked the practical step of definitely selecting a suitable number of spectrum colors as standards and the establishment of the wave length of each by which it may be redetermined at any time for comparison with pigmentary colors.

With but three standards as in the Brewster scheme, known as the red, yellow and blue theory, the rotating disks are of no value, be-

cause with this method of combination the blue and yellow make a dull white or neutral gray, and the other two combinations produce very dull colors, of no practical value as types of pure color.

But when at a comparatively recent date, the six most distinct colors of the spectrum, Red, Orange, Yellow, Green, Blue and Violet, were selected in the spectrum itself and their several wave lengths determined and Maxwell-disks prepared in these colors, and also white and black, then for the first time was presented to teachers, manufacturers and all interested in the subject a practical and definite system of color nomenclature, requiring for its perfection only the conditions suggested by Professor Church, already referred to, except that instead of the couple of hundred standards in enamel, but six spectrum standards and a white and a black are now necessary The results secured from these six spectrum standards and white and black applied to Maxwell disks give instead of a couple of hundred, an almost infinite number of colors, limited only by the perception of color differences possessed by the human eye ; and any one of these color effects may be accurately named in terms of the colors employed in the disks. For the purpose of a nomenclature these six colors are termed Spectrum Standard colors and each is located in the spectrum by its wave length determined by the spectroscope.

The wave lengths of these six Spectrum Standards are represented by the following numbers in ten-millionths of a millimeter :

Red, 6571 ; Orange, 6085 ; Yellow, 5793; Green, 5164 ; Blue, 4695 ; Violet, 4210.

To the best possible pigmentary imitations of these six pure spectrum colors a white and a black are added, thus furnishing eight standard color disks which form the basis for the only practical color nomenclature ever brought to the attention of the public. The six colors above named have been selected as standards not because colors having the same names were commonly in use, but because these names were already applied to the six locations in the spectrum which seemed to best serve for standards. This fact, however, seems to indicate that there is in these six colors an element of individuality which was the occasion for their selection as the fittest types by Newton and others, and which secured a unanimous verdict regarding each color when the Bradley standards were selected.

These colors having been selected in accordance with the

trained perceptions of a considerable number of competent persons comprising artists, teachers, and others, as the most desirable standards, the attempt has been made to secure the best possible imitations of each in material colors, such as pigments, papers, etc., to serve as material or pigmentary standards of color. While the spectrum colors indicated by the above numbers are unchangeable and serve as *permanent standards*, their material representations must necessarily be imperfect and subject to improvement in the future, as chemical processes in the manufacture of pigments may afford purer imitations of the spectrum standards. But the improved pigments will still produce the same colors as before, only purer and probably more intense, and hence will represent the same spectrum standards from age to age.

The best material color is but a weak approximation to the pure spectrum color, but the one aim must be to secure the same kind of color, as for example an orange neither more red nor more yellow than the location in the spectrum chosen for the standard orange.

From the pure spectrum colors, i. e., the sunlight colors, it is possible by reflection to combine two adjacent standards in various pairs to imitate other spectrum colors between the standards.

For example, if two small mirrors are held in a spectrum, one at the "red" and the other at the "orange" so that the two colors are reflected upon the same spot on a white surface the result is a color between red and orange. So also if we mix red and orange pigments together we may produce various colors between the two which will be orange-red or red-orange as the relative quantity used of each may be changed; but there is no way by which the quantity of color effect produced by each of these pigments can be measured and thereby recorded.

We have however in the "Maxwell rotating disks" a means for imitating, measuring and recording material color effects, which is at once convenient and accurate, and the results correspond in principle with those secured by combining the spectrum colors by means of the mirrors, as also the effects in nature caused by reflected colored lights.

Every boy knows that if he rapidly whirls a lighted stick, the coal of fire at the end produces a circle of light, which phenomenon is caused by the quality of the eye called retension of vision, by which the impression made on the retina remains during an entire rotation

of the point of light. By the same quality of vision, when one color is presented to the eye and instantly replaced by another the effect is a combination of the two colors to form a new color.

Therefore if for example one quarter of the surface of a disk of cardboard is covered with red paper, and three quarters with orange paper, and the disk rapidly rotated on a spindle, the result is a new color which is a mixture of these two, or a red-orange. Another most valuable feature of this phenomenon is that the resulting color is directly in proportion to the angular measurement of the two sectors of color formed by the overlapping disks, so that if the circumference is divided into 100 equal parts the resulting color will be definitely named by the formula "Red 25; Orange 75," or in general terms as a reddish orange or red orange.

In commencing work with the rotating disks and colored papers made in accordance with a system based on their use, one must once for all discard the old myth that the three primary colors, red, yellow, and blue, have any reason for their existence as standards on which alone to base color education or color practice.

A set of colors to be used as standards in any system of color investigation or instruction must be such that practically all other colors of equal purity can be made from them by combination. The smaller the number that will meet this test successfully, the better, because of greater simplicity of nomenclature that will be possible.

If a Maxwell disk, of a spectrum color is combined with a white disk by rotation, the result is a tint of that color. Tints may also be made by mixing white pigment with the colored pigment, or by diluting water colors with water.

If a color disk is combined with a black disk by rotation or if a shadow is thrown upon the color, or a dark neutral pigment mixed with a color the result is a shade of the normal color, and thus we may select shades for each color which with the normal color and its tints will form a scale of that color.

If we combine a white and a black disk in various proportions we secure by rotation a series of grays, which are typical colors because they are devoid of spectrum color, i. e., are absolutely neutral grays. These grays are very perfect imitations of a white surface in shade or shadow, which cannot be guaranteed in any pigment combination.

As the orange disk for example, when combined with a white disk,

gives a tint of orange and with black, a shade of orange, if we combine it with both a white and a black disk the result will be a gray orange or a broken orange. This is an example of an entirely distinct class of colors which may form a series of typical "broken colors," representing a very large and wonderfully beautiful class in nature and art.

All material colors are more or less fugitive and therefore the true color cannot be preserved for a long time, but a pleasing effect once produced can be recorded in a black and white outline design with the true colors indicated on the various parts of the design in terms of the rotating disks. The true colors of flowers when fresh can be determined and recorded by the use of the color top, and after the flowers have been pressed the original color can be indicated opposite each part and thus a record of the colors as well as the form preserved indefinitely.

This is but one very simple and familiar example of immense benefit to every branch of science and art which a generally accepted and accurate color nomenclature will secure. No doubt it promises more immediate advantage to the manufacturers than in the fine arts, and yet its benefits along all lines can at best be only imagined. With any one who becomes interested in the principles of color studies and a color nomenclature, the subject grows immensely till he wonders how he has gone through so much of his life seeing so little of the beauty about him.

HISTORY OF THE WAR.

The Boston Times has prepared the following brief lessons on the war of 1898, which it believes will be in general use in the schools in 1948.

Teacher of history — "Willie, what was the main thing which hastened the Spanish-American war?"

Willie—"The destruction of the Maine mainly."

"What happened then?"

"A battle on the main."

"The Spanish main?"

"No."

"The American Maine?"

"No; just outside Main-ila."

"Did the Americans fight well?"

"With might and main."

"What remained?"

"Not much of Spain."

"What caused the war?"

"Spanish do-main"

"On the main-land?"

"No; on the island of Cuba."

"Very good, Willie; always remember the Maine."

INTELLIGENCE OF PARROTS.

A. NICAISE, in "LA NATURE."

I have for 23 years owned a female parrot of Gaboon, with ashen gray plumage and a red tail, aged at present about 48 years, and the reader will find figures herewith. This bird, whose plumage is very well preserved for its age, is so remarkably intelligent that it has seemed to me that it would be interesting to give an account of it to my readers. Although it imitates and remembers all the noises and sounds that it hears, the characteristic of this bird is a particular originality which is peculiar to it, and which makes of it both an imitator and a creator.

Before it became my property this bird was kept in a house at Paris that had a large number of tenants. It imitated to perfection the language of the sparrows that fought upon the roof and in the court yard of the house, their contests in spring for the possesion of a nest, and their daily quarrels.

It imitates also all the cries of Paris, and especially the cry of the clothes peddler, and many a time have the inhabitants of the house been deceived by this faithfully produced sound. When my brother-in-law gave me this bird in 1870, I placed it in the hands of our farmer, in the country, while I was doing service in the army during the war.

Its repertory then became enriched with all the sounds of nature—those of the quail, the owl, the magpie, the cock, and the hen, in all their vocal manifestations.

It excels in the phonetic reproduction of the death of the hog, at which it has certainly been present. It reproduces in the first place the broken cries, low or shrill, of impatience and fear of the animal while being dragged to the place of slaughter, and then the howls of anguish during the process of throat cutting, and this with the same shades of gradation and force as manifested by the animal itself. Although it has not heard these sounds in 22 years, this death fantaisie passes through its brain from time to time, and it rattles the windows of my house with it to such a point that I am obliged to silence it.

My parrot observes every motion that procedes an act which will be accompanied with a sound. If it sees me approach an open window and prepare to close it, it immediately imitates the noise made by the window before I have touched the latter. If it sees me holding a handkerchief, it wipes its nostrils. If it sees me holding an overcoat or a frock coat, it immediately, and in advance, makes with its wings the motion that I am going to make with my arms in order to put on my coat.

When my parrot sings it faithfully imitating the human voice, it often passes from deep bass to the purest soprano in continuing the air.

It likes to open its cage in order to walk around the room and to get under the furniture and to hack the legs thereof with its bill, while it cuts oak with the same ease that it does white wood.

After having carefully and patiently studied all the systems of hooks employed for closing its cage, it unfastened them all. The door was then closed with a carbine swivel. It studied and recognized the mechanism of this, and succeeded in opening it by resting one foot upon the interior spring, while it opened the hinge with its bill. For several months past the door has been closed by a padlock and key. The bird has passed hour after hour in studying this new device, and in turning the key in all directions, but has not yet succeeded in opening it, because the spring is of hard steel.

I should never have ventured to speak of these astonishing phenomena of intelligence on the part of this bird had not hundreds of persons witnessed thereof for the past 23 years.

It improvises true musical morceaux which it whistles incessantly and varies without ever repeating it. It produces them with a style that a conservatory might envy. It improvises in the presence of anyone whatever when its mistress asks it to sing. When other persons listens, it interrupts its musical strain from time to time to burst into a laugh, mingled with "oh!" "ohs!" which indicate that it is happy to be listened to. Before improvising, it often preludes by gamuts trilled and vocalized, like those practised by a singer to get her voice into trim before going upon the stage.

From time to time it stops in order to dry its throat, to swallow its saliva by a motion of deglutition, accompanied with a quick stroke of the tongue against the palate, so that the whistling shall come out with great purity I should say the sound of the flute, for one might believe that he was

listening to a large, flexible and well timbred instrument of that kind. The grave notes of this instrument are truly remarkable.

It imitates the sound of flowing water. If it sees me holding a glass of water, or merely approaching it, it immediately imitates in advance the sound of swallowing and the descent of the liquid into the throat. If it sees a cat, or if any one calls a cat, it at once imitates all the various forms of thc cat language, and the same as regards dogs, horses, and asses.

My parrot puts into all these imitations, often interrupted by peals of laughter, an intelligent intention, malice and devotion.

But what is of especial importance to make known about the bird is its faculty of understanding of what is going on around it, and of participating therein in language and actions. When any one talks before it, it takes part in the conversation by "oh's" and "ah's" of astonishment. It bursts into a fit of laughter if a person says something funny with an air of jovialness. If it needs anything it calls its mistress by her first name —Marie, and if she is tardy in coming, its voice gradually becomes impatient.

On a certain winter's day it was placed in its cage near the fireplace. A log of wood rooling outward covered it with ashes, sparks, and smoke. Its mistress, busy in an adjoining room, heard it call, "Marie!" "Marie!" like a person a prey to a danger or excessive fright, and she ran to its assistance.

When its noon meal is served to it, consisting of a few dainties, my parrot daily reserves for its evening meal a piece of bread and preserves.

It does not like men, who could not touch it without being attacked with its bill and sharp claws. On the contrary, all its caresses are for women, especially little girls. It suffices to be of the feminine sex to be able to touch it and caress it without danger.

It loves its mistress to distraction. It obeys her commands, and when she corrects it by giving a few light taps with the finger on the bill or head, it licks the finger that strickes it, and utters little cries, asking her pardon.

When, after having gone out, I return home, it knows who it is through the wall, and, although it cannot see me, it apprises its mistress by singing two notes— do, do, the second in the octave of the first. It does that for no other person in the house.

It says good-day to me in the same manner every time that I enter the room in which it is placed. If I give it anything, it

thanks me in voice and action by raising its wings.

But my parrot excels especially in the extraordinary gift of being music-mad and composing bird. If it sees a polka danced, it accompanies it with short notes.

LOWELL TEXTILE SCHOOL, CLASS 1901.

The class of 1901 met on Nov. 21st, 1898, for enrollment and election of officers. E. M. Murphy was chairman. The following were present and enrolled as members of the class:

D. C. Buchan, L. B. Cranska, W. L. Dabney, C. W. Collins, C. E. Foster, J. P. Leach, Jr., W. Marinell, E. M. Murphy, Wm. R. Moorhouse, B. M. Parker, P. B. Parks, R. W. Reynolds, A. H. Weber.

The election of officers was next in order and the following names were put forward for president:

Moorhouse, Dabney, Murphy, Foster.

On counting the ballots Moorhouse received 5, Foster 3, Murphy 2 and Dabney 2.

Mr. Moorhouse was declared elected and on motion of Mr. Murphy his election was made unanimous.

Mr. Moorhouse took the president's chair and in a nice speech thanked the members for the honor conferred upon him.

The election of vice president was next and the following names were voted upon:

Foster, Dabney, Murphy, Leach.

Murphy and Dabney receiving the same number of votes they were voted upon again with the result that Mr. Dabney received the most and was declared elected.

On motion of Mr. Murphy his election was made unanimous.

The election of secretary and treasurer was next considered and B. M. Parker, was elected by acclamation.

After some little talk the meeting adjourned.

B. M. PARKER, Secretary.

"Somewhere in the south," says Congressman Sulloway, "a bright colored boy appeared before the civil service commission to be examined for the position of letter carrier. 'How far is it from the earth to the moon?' was the first question asked by those who were to determine the young man's fitness for the place he sought. 'How fah am it from the earf to de moon?' echoed the applicant. 'My Lawd, boss, if you's gwine to put me on dat route I don't want de job.' With that the young man grabbed his hat and left as though he were chased."

THE LOWELL TEXTILE JOURNAL.

A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager.

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid $1.00
Single Copies 10
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the twenty-fifth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

A Happy New Year to all.

.·.

Consider these suggestions.

.·.

What are you doing to make yourself valuable in the position you now occupy? Inquire within.

.·.

The best way to discipline ourselves against scandal is to believe all stories to be false which ought not to be true.

.·.

Let your aim be high. Let some object fire your whole being. Our country holds out a thousand situations which you might fill honorably.

Workers who cannot be spared. This is one of the question employers ask themselves when business becomes slack and it is thought necessary to economize.

.·.

The make-shifts, those who shirk their work.—Somebody's proteges, good-for-nothings—those who *continually* are tardy and careless.—These are not the ones who are called for when responsible positions are to be filled.

.·.

If you are doing with your might, all your studies and exercises, the chances are ten to one that you will soon become valuable for some responsible position, and when a slack time comes you cannot be spared from it.

PIN MAKING.

Of pins it is said that some of the large department stores often order 100 cases at a time. Each case contains 108 dozen papers and each paper 360 pins, so a little use of the multiplication table will show what an immense thing even the one order means. The yearly output of pins from the largest factory in the United States, it is claimed, would, if placed end to end, reach three times around the world.

SIMPLE LESSONS IN PHOTOGRAPHY

FERROUS-OXALATE DEVELOPMENT.

There are numerous systems of development, such as those of iron, alkaline pyrogallic, alkaline hydroquinone, and alkaline eikonogen, etc.

We shall describe the iron developer first, inasmuch as it is by far the simplest; and, although in many cases it is perhaps not so affective as the others, it will serve as an excellent introduction to the art of negative development.

Having prepared in separate bottles a saturated solution of protosulphate of iron (saturated in the sense that the water can dissolve no more, and that there are undissolved crystals still lying on the bottom) and a saturated solution of neutral oxalate of potash, and having previously added two or three drops of sulphuric acid per pint to the iron solution to ensure acidity, lay the plate down, face or film side up, in a flat developing dish, and pour over it enough water to cover the surface.

Allow this to stand, carefully protected from the red light, while three drachms of the iron solution are poured into a graduated glass measure, to which is then added a quantity of potassium oxalate solution sufficient to make two measured ounces.

The mixing of these two solutions, colorless in themselves, or nearly so, produces a red fluid, the color of which, however, will scarcely be observed in the red operating light.

Now, tilting up the dish containing the negative, pour off the water, and then pour in the ferrous —oxalate developer which has just been mixed.

Rock the dish gently backwards and forwards to ensure the liquid passing over the face of the plate, and, if the exposure in the camera has been correct, an image will speedily begin to appear on the plate.

The sky and best-lighted parts will show first, followed by those portions that were not so well lighted.

By slow degrees the whole image will be out, and it will be seen that the lights and shadows of the picture are reversed, the darkest part of the negative being the sky,

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Therefore, the Latest Styles in
Hats and Gents' Furnishings.
Goods at Moderate Prices.
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DIAMONDS, WATCHES and RINGS
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the inversion proceeding regularly down to the deep shadows under trees, and so on, which, in the negative, are represented by almost bare glass. It is desirable to continue the development until the half tones shall have become merged into the high lights, scarcely anything remaining visible but the deepest details. At this stage the plate must be removed from the dish and subjected to a rinsing with water. When held up against the red light, all the details of the picture will now be seen.

If these appear to be imperfect, it is not yet too late to return the plate to the developing dish for further treatment.

When it is believed that the whole details have been brought out in a sufficient degree, the plate, after washing, is transferred to a dish containing a

FIXING

solution, which "fixes" or dissolves out those portions of the sensitive plate which have not been acted upon by light. This should consist of hyposulphite of soda; and a degree of strength of four ounces to the pint of water will be found to make a suitable fixing bath.

By immersion in this solution the unaltered parts of the sensitive surface disappear; this can only be properly ascertained by lifting up the negative and examining it from under or plain glass side. It must remain in this solution a little longer than suffices for ensuring the removal of the white film, after which it is placed in a dish of water to secure the removal of the hyposulphite of soda. In this dish the water must be very frequently changed. It is difficult to say precisely how long a negative should be washed, but it is safe to leave it in changing or running water for an hour.

After this it is reared on an end to dry—or place in a rack with the bottom corner on a piece of blotting paper to dry spontaneously, remembering that we must never attempt to dry a plate by heat or place it in the sun.

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CARD CLOTHING,
EGYPTIAN COTTON, Etc.

"PIQUE" CLOTH.

Pique or Repp as it is sometimes called is a heavy and good wearing fabric and can be put to a variety of uses, such as children and ladies' dress goods, gentlemen's ties, vestings, etc., and on account of the manner in which the threads are interlaced and stitched with each other it is capable of withstanding a large amount of strain thereby possessing good wearing qualities. One of the special characteristics of these cloths is that of ribs or furrows running across the piece from selvage to selvage.

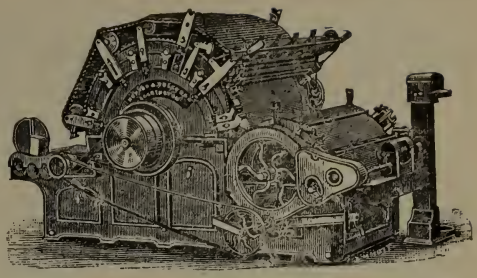
The word Pique seems to have been derived from the French which means to stitch and if we examine a pique cloth it will readily be seen how the backing threads are stitched into the face cloth. It is this binding of the threads which gives the firmness and strength to the cloth and as it is also this that forms the ribs or furrows, we can readily alter the size by putting in more picks before the stitching or backing threads are raised and so get a larger rib, or by reducing the number thereby getting a smaller rib.

These goods might be classed under the heading of double cloths, for in order to make a pure pique cloth it is absolutely necessary that two warps be used, one for the face cloth, and one for the backing. The warp that is used for the face cloth is woven entirely plain, while the backing threads are never intersected with filling only at the time they are brought to the surface of the cloth to form the rib.

These warps are held at different tensions, the warp which is forming the face cloth being comparatively slack, and on account of the manner of intersecting the thereads with each other that of plain order a large amount of contraction or take up will take place, in some cases amounting to from 20 to 25 per cent.

The backing threads are held

STUDY
the points of our different machines and compare with others.
UNDERSTAND
the merits and you will be convinced beyond a doubt of their superiority.
HOWARD & BULLOUGH
American Machine Co., Ltd., Fawtucket, R. I.



equally tight and as they are floating under while the face cloth is being made and only being brought to the surface of the cloth, for two picks, very little contraction will take place, 3 per cent. for such would be ample.

In order to produce a more prominent effect in the rib extra picks are put in between the face cloth and the backing threads. This is done by raising all of the face harness out of the way and then inserting the picks. If made in an ordinary loom the same filling that is forming the cloth is used, but if a more pronounced or embossed effect is desired we have to put in a coarser filling, or as it is called wadding picks, thereby using the box loom.

The face cloth being woven plain four harnesses can be used to produce it, the backing threads can be put on four harnesses.

Suppose a fabric was required 30 inches wide, 80 face threads per inch, then the number of threads required will be 80x30=2400 threads. As the face threads are as 2 is to 1 to the backing threads therefore 1200 threads will be required for the backing warp. Before drawing the threads through the harness it is necessary that the right number be put on the harness shaft, generally one or two extra are put on so that they will be there if there should be any mistake in the drawing in.

In this case there are four harness shafts and 2400 heddles have to be equally divided between them so there will be 600 heddles for each harness shaft, for the back four harness there will be 300 on each shaft. The reason why four harness shafts are used for the plain is that if only two shafts were used there would be too much crowding and also it would require too much power to raise and depress the harness on account of there being so many threads and consequently so much weight to one shaft, so that as clear a shed could not be got as when using four harness.

Drawing In Plan.—As the face

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cloth has to be entirely plain and four harnesses are allowed for it, the general method is to work the harness in pairs and draw in the threads as, 1, 3, 2, 4, so that the full lay out will be 1, 3, 5,—2, 4, 6, —1, 3, 7,—2, 4, 8. The bottom warp that is put in the loom must be for the face cloth and consequently all the threads from that warp must be drawn through the first four harnesses, and the threads from the top warp must be drawn through the back four harness.

THOMAS NELSON,
Student, Lowell Textile School.

To be continued.

MR. ARTHUR PRIESTMAN ON TRADE ORGANIZATION.

On Monday night a lecture, entitled "Trade Organization," was given by Mr. Arthur Priestman to the members of the Bradford Textile Society at the Technical College. The new president of the society, Mr. A. Ebstein, occupied the chair. Mr. Priestman, after speaking of the intensity of modern competition, said he thought that bad grade was due to the failure to regulate supply to demand. When two people tried to make a living out of the duty of supplying the needs of a small community, where one man was sufficient, either the community suffered by paying enhanced prices for its groceries, or the second comer must share the wages of the first. Supposing the customers of Bradford took from the manufacturers a million pieces of cloth or stuff goods a year on the average, and three hundred mills with their machinery were quite able to supply the demand, and yet there were three hundred and fifty mills competing for the business, it stood to reason that the surplus fifty would in time be beggared, their machinery valueless, and their workpeople idle. The present commercial system was built on such a crazy basis that even

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the improvements and inventions to save the labor of the people actually increased the want of employment, and made the men and women who were the producers of the wealth of the country the greater sufferers by the very causes which in any well-contrived system of society should add to the comfort of all A strange, not to say peculiar, feature of the present commercial crisis was that it was concurrent with enormous stocks of goods held by merchants, and probably by manufacturers too. So that at the very time there was the greatest abundance wherewith to clothe the people, they saw around them the greatest number of ill-dressed, shabby, and, if the weather was cold, shivering men, women, and children requiring the very articles of which there was a glut in the market. Why did it not occur to their statesmen, who were forever calling out for new markets whereupon to dump down the contents of their bursting warehouses, that they had a market in England itself which needed opening out to commerce, namely, the people who under their competitive system wanted better clothes, but had not the means by which to buy them? They could not hope that a system which operated so that there was a tendency for all wages to sink to the level of the least wage which would sustain life could ever enable the workers to consume more. For at present they were suffering from under-consumption, not over-production. A short discussion, in which several members took part, followed. Votes of thanks to Mr. Priestman for his lecture and to Mr. Ebstein for presiding were passed and the meeting then ended

THE LOST CHORD.

Edith—"Ma, that new maid is dreadfully stupid."

Mamma—"What has she done?"

Edith—"Why, I wanted to practice a little, so I sent her to the music-room for 'The Lost Chord.'"

Mamma—"Well?"

Edith—"She brought me the clothes line."

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PROFESSOR BEAUMONT ON GERMAN SCHOOLS AND COLLEGES.

The Yorkshire College, Leeds, enjoys a reputation in the North and throughout the country as one of the leading institutions for the education of young men for commercial and manufacturing pursuits. No one can go through the College, with its manifold departments for theoretical and practical instruction, without being convinced that an excellent work is being carried on, and that here, at all events, is a well-organized effort to assist England in maintaining her commercial supremacy against all comers. A few weeks since Professor Robert Beaumont, Chief of the Textile Department of the College, gave me an impression of his views upon the question of German competition, with special reference to the goods manufactured in the West Riding. The professor has made personal investigations on the Continent, visiting the schools and colleges and inspecting many of the mills.

Ahead in Education.

The fact to be considered in any discussion upon the subject (said the professor) is that the Germans have been ahead of us in technical education. For half-a-century they have had weaving schools, whereas English weaving schools date only from 1875. For the first decade the prejudice was strong against the work of textile classes in England, so that the benefit accruing to us from such institutions is only of recent growth. There can be no question as to the soundness of the German system of education, especially its commercial careers have to go through a specific course of training, distinct from the secondary and higher grade schools such as we have in England. This commercial training prepares the

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student for the merchant's office, giving him the requisite information upon the industries of all countries, and especially those likely to be purchasers of German productions. Each town of any industrial importance has its commercial museum, where specimens of the manufactures of other countries may be inspected. The goods in these museums are classified and priced, so that at the outset of his business life the German youth has a knoweldge of the comparative values of the products of all manufacturing countries. There is no corresponding scheme in England. The County Councils, especially in the West Riding, have recently taken this matter in hand, and instruction is now being given in commercial geography and merchanting. A matter for some surprise, however, is the small degree to which higher technological education has benefited by the West Riding County Council scheme of technical scholarships. It cannot be gainsaid that the Germans possess well-equipped schools for this purpose in connection with weaving, and the manufacturers of Germany are in full sympathy with them. In some instances in addition to state endowment these schools are financially assisted by the manufacturers, who thus show in a practical way their appreciation of the advantages to them of such schools. Manufacturers' and merchants' sons connected with the weaving industry consider it quite as natural to take a course of instruction at the weaving schools as to become proficient in the usual subjects of education. Here, on the other hand, it is probably more the exception than the rule for the future manufacturer to be thus equipped.

English and German Machines

Many of the English manufacturers have been very successful in the past, because they had the machinery in their favor. About 20 or 25 years ago in addition to English machinists supplying the home manufacturers they were largely supplying the various textile centres of the world. Now excellent machines are made in Germany,

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which from my own examination I can say are comparable with those constructed in England. Machinists in Germany have afforded their customers valuable aid in order that they may have machines which will enable them to successfully compete with Englishmen using English-made machines. By this I do not imply that there are even signs of the lack of enterprise on the part of British machinists, who are serving the weaving industry well in this country, but to emphasize the fact that it is not simply in the production of the fabric that we have to look for German competition, but also in the machine market. Up to the present there has been no importation of German machinery into England, but the instruction given in mechanical drawing and machine construction, is qualifying the German machinist to compete effectively with our own country. We still have the lead, and a strong lead, in machinery, but the German is not the man to buy Germany machinery if English machines are better —he will have the best. In the Aachen Weaving school (the principal institute for woolen and worsted manufacturing), which is state endowed, every process of manufacturing is taught from the raw material to the finished cloth. The school has an able staff of teachers, and there is a small museum. The students are chiefly manufacturers' and managers' sons, who give their whole time for about two years' curriculum of study to this part of their training. The theoretical course is particularly strong, but the experimental is not thought in England to be the ideal. In most of the German schools the idea seems to be to approach as nearly as possible to mill work, experimental designing, etc, which are really the most beneficial to the learner, being regarded of secondary importance. In teaching, the object should be to give the student a large number of well-selected experiments, so that he may obtain useful and varied data impossible of acquirement in any one particular mill. The German teacher believes in piece-making in the school. Now, in my judgment,

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that can be better done in the mill than in the school, the function of the school being to impart knowledge to the student by experiments concerning how patterns and designs are produced, cloths constructed, and varied in appearance, handle, and finish. Therefore, as far as the actual instruction goes, the work of our schools compares favorably with the work of those in Germany.

Musem of Specimens.

There is a great need in this country for an extensive museum of woven specimens such as the Germans have, either in connection with their schools or as independent institutions. It is impossible for a designer for any length of time to originate novelties unless he has a private collection of specimens—which can never be very comprehensive—or easy access to a museum. At present we have in England a textile museum at South Kensington of ancient decorative fabrics and Indian textile specimens, and the Cloth-workers' museum at the Yorkshire College. The latter is now open on Tuesday and Saturday afternoons from 2:30 to 5 p. m., to all designers, manufacturers, and others interested in the industry.

I am told (said the interviewer) that there is a close and practical relationship between the German manufacturers and the technical

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institutions. Do the English manufacturers show a similar interest in our colleges?

I can assure you that the professors of English colleges are anxious to give every possible assistance to manufacturers. Consultation is growing, and is likely to grow, as manufacturers see the benefit to be obtained.

It is said (continued the inquirer) that German manufacturers often send to their colleges to have exhaustive reports made upon certain specimens they wish to compete with. Does such a practice obtain in England?

Yes, to a certain extent. Many of the intelligent, far-seeing manufacturers are visiting our college for information and assistance. We often make special investigations at their request. We are arranging in our carding and spinning department for solutions of textile problems, such as could not be solved in a mill, because in the mill there is neither the time nor the apparatus. This will be a valuable section of our work, and we shall make special research.

Some gentlemen to whom I have spoken say that the Germans are better designers than the British?

I do not agree. In the Leeds and Huddersfield districts we have some of the best fancy worsted and woolen designers in the world.

The Two Systems.

English youths occasionally "finish" in German institutions; but have the Germans any college better than your own at Leeds?

In Germany they have more schools and colleges; but I question whether any one institution is superior to our own. Many young fellows from Germany and other continental countries become students in the Yorkshire College. But remember there are very few such institutions in England, whereas every German town has its technical college, from which students can be passed on to the higher college instruction. The Yorkshire College should be a kind of Technical University for advanced instruction, the elementary training being given in smaller schools. Do not suppose that I

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disparage such technical schools as you have in your own district—schools which are doing excellent work. It is a fair question for discussion whether the English or the German school contributes most successfully to the extension and developement of the weaving industries. The course of instruction in the Yorkshire College gives the youth a sound theoretical ground work, and a knowledge of cloth structure, pattern designing, and finishing. We are now introducing a carding and spinning section, to be equipped with the latest machinery for the production of all kinds of woolen and worsted yarns. You will see that in this school we can systematize the information and focus it in a way which could not be done in any mill.

The Englishman, above all things, I remarked, is practical, and is influenced by results. Can you give any instances where students of the college have done better in consequence of the instruction received in this institution?

Many cases could be quoted in which young men who have been trained here are solving problems relating to the manufacture or construction of cloths which baffle designers and managers who have not had the advantage of this training.

In the course of further conversation Prof. Beaumont said: We cannot expect to excel in every class of textiles, and we should cultivate those branches in which we undoubtedly hold the lead For the best designs and higher class goods all foreign countries have still to come to England and Scotland; but to the lower branches of mantle and dress materials the German has made greater progress than the home manufacturer. The German cloths are cheaper, and there is more novelty. It is ques. tionable whether we should attempt to compete with the foreigner in this line, in regard to which he has the advantage of lower wages, longer hours, smaller profits. Our object should be the development of the branches in which we excel; it would be deplorable if we permitted ourselves



to be beaten on this our own ground. In the fancy woolen and worsted trades we ought to continue to supply the best markets of the world, whether Continental, American or Eastern.

A Fatal Waste.

In contrasting the educational conditions of other industries with that of textile manufacturing. Professor Beaumont laid stress upon the want of exact data available to the student of the woven arts; whereas in other industries the process of systematic accumulation of knowledge, had been operating for a long period. It could well be understood that amidst the meagre requirements of the manual methods, the experience of the individual was a sufficient guide, but now the multiplied details and the intricate mechanical and chemical processes which the modern manufacturer must be acquainted with, create a palpable want for fuller information. One manufacturer may have discovered how to obtain the best results, whether in yarn or cloth, from certain classes of materials; a second had similarly succeeded with materials of different properties, but it was not the province of either to record for the benefit of others what had cost time and money to explore. Therefore the future generation of manufacturers, unless other assistance were afforded them than that due to mill life and practice, commenced in a like position in relation to their knowledge of these subjects as their forefathers, so that each race of manufacturers would possess the same cycle of knowledge. Progress in any science or technelogical art was effected by experiments conducted systematically, and of which correct records



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were kept. A loss in the transmission of knowledge in any industry implied the most fatal waste. What was wanted to ensure permanent impetus and growth in the textile industries was the carrying out of investgations, whether in materials, yarns, or fabrics, which those employed in the craft would have the opportunity of consulting We ought to be in a position to illustrate how, under given conditions, a certain combination of fibres will yield a yarn of such strength and elasticity, and similarly with all known blends of materials. This method of research would afford those occupied in yarn spinning and manufacturing, reliable data, which would assist them in the further development of several branches of the industry. This question was not of individual, but of industrial moment. It might be advanced that data of this kind would give the entire textile community like advantages, and therefore, foster competition; yet those who were first in the race would generally be first amongst those to benefit by a scheme so capable of extending our weaving industries. Professor Beaumont did not belittle German competition. He admitted it is a serious factor, and says that it has to be reckoned with. One of the best ways of meeting it is a happy combination of the theoretical and practical, making the best use of the school and the factory.— *Batley Reporter.*

AFTER-DINNER EPIGRAMS.

Mr. I. Zangwill, the author, gave the toast of "The Trade" at the Booksellers' Provident Institution the other night. Here are some of the "smart" things he said:

"Of the making of books there is no end; of the making of liter-

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ature there may be no beginning."

"I once met a lady in an omnibus, who said to me, 'Are you Mr. Zingwill?" I said, 'I am.' She said, 'I read one of your works six times.' 'Madam,' I replied, 'I had rather heard that you had bought six copies.'"

"It is a mistake to suppose that literary men do not want money. They do not embrace literature because there is money in it, but they expect to make money out of.

It is the difference between marrying a woman with money and marrying a woman for her money."

"And as the literary man must have money, Providence invented the bookselling trade."

"It is better to sell a good book than a bad book, if the profit is the same."

"We write books too quickly nowadays. There was once an author who wrote just as many books as his wife gave him children. But one year she produced twins, and he was a book behind. There are a good many authors who keep pace with triplets."

"We get books too easily nowadays; we get them from circulating libraries, and return them; we borrow them from friends, and do not return them; and we get them from philanthropic libraries free of charge, and these libraries add insult to injury by begging a free copy of his book from the author."

THE CRITICS.

I wonder what happens the critics of the plays,
When they cease to exist on our sphere,
For I doubt if St. Peter would ever admit,
A soul that was wearing a sneer?

I doubt furthermore if a critic was "passed,"
(There are women critics you know.)
That the canons of art would allow her to stay
Where her pen must of course be *de trop*.

I doubt if the Devil would welcome the guild.
For a critic must wear a cross face,
And the Devil's afraid of a cross, as you know,
So where dwells the last resting (?) place?

It must be that the reincarnation's a fact,
And the ones that penned sarcastic things
Are the bugs and mosquitoes that prowl round at night
Still seeking a use for their stings.

ORMSBY A. COURT.

Lowell Textile Journal

JACQUARD CARD CUTTING.

An essential preliminary to weaving on jacquard looms is the preparation of the packs of cards, the perforations in which control the movements of the hooks determining the design woven into the fabric. This work is almost entirely mechanical in its nature, and permits of the use of automatic machinery to a great extent, by the aid of which the cost of preparing the cards is reduced to a very low figure.



PIANO MACHINE.

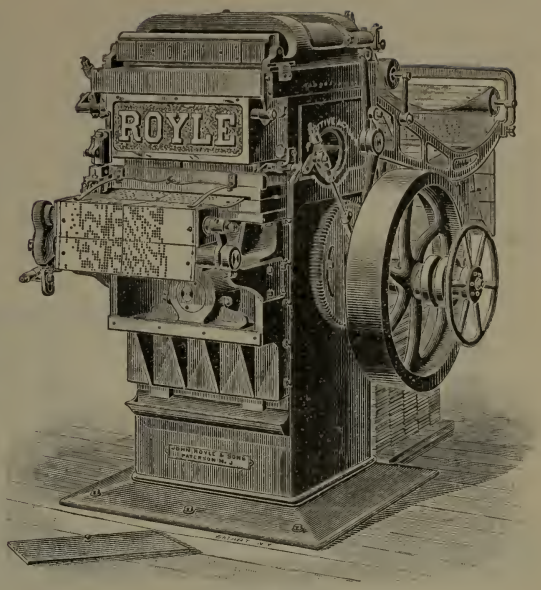
It may not be amiss to roughly outline the more important machines used by card cutters, and explain briefly their uses and value.

The design having left the hands of the designer, it becomes necessary to make, in suitable cards, combinations of perforations corresponding to the form of the pattern it is desired to weave. The first pack of cards cut from the design, which, for the sake of clearness, we will call the pattern pack, must be cut by hand. For this work, a Piano Machine is used, so called from

its fancied resemblance to the musical instrument of like name. This machine is not automatic, but must be handled by a skilled operator, trained to this particular service. The idea of the machine is as follows: The design is fastened to the reading-board in such position that the squares in the design paper shall correspond to the motions of a small indicator which travels across the design in harmony with the movements of the machine. Below this reading-board is fixed a small punching press containing a number of punches corresponding to the number of perforations in one line across the width of the card. These punches are held in a head of such size and shape as to be readily grasped by the hand and are controlled by keys so set as to be moved by the fingers of the operator. This miniature punching press, or cutting-head, is connected, by a series of shafts, to pedals, by depressing which the punches are brought down, such of them as are held in place by the keys perforating the card which had been previously placed in position in the press. After each stroke the card is automatically carried forward the width of one line and placed in position for the next stroke. This operation is repeated until the entire length of the card has been cut to match one line of the design. It will be seen by the above description that the plan of this machine is quite simple. An experienced man can cut cards very rapidly, but in order to do good work, it is quite essential that the machine be built with a good deal of care and that all mechanical details be carefully adjusted and harmonious in their action. Bad workmanship results in a hard-working, bad-cutting machine, expensive to use and tiresome to the operator, with consequent small net results at the end of the day's work. In purchasing a Piano Machine, the best made machine should always be selected, as it is poor economy to buy a machine which is built in an inferior manner.

The original pattern pack having been cut, it remains to make as many duplicate packs as it is wished to set looms at work on that particular pattern. As it would be too costly to make up all of these packs by hand, on the Piano Machine, a repeating machine is used, which automatically duplicates the cards in the pattern pack. The repeater is quite an elaborate affair and is one of the most beautiful pieces of mechanism used in textile work. Speaking broadly, it comprises a punching press containing as many punches as there are hooks in the jacquard and an equal

number of selecting needles and keys, all fitted together in somewhat the form of a jacquard action. In operation, the pattern pack is supported on a raceway at the back of the machine and led up over a perforated jacquard cylinder. A second pack of cards, laced together, but blank, is passed into the die, beneath the punches When in a normal position, over each of the punches rests a key, so that when the machine is put in motion and the die descends, each punch will cut a perforation in the card beneath it. These keys, however, are controlled by needles which, when pressed inwards, draw back the key from above the punch, permitting the latter to be forced up by the card, without perforating it. These needles terminate opposite the perforations in the cylinder over which the pattern cards pass and which moves back and forth with each turn. As it advances, the pattern card to be duplicated is pressed forward against the needles. Wherever there is a perforation the needle passes through it, without withdrawing the key from above the punch. Wherever the card is blank, however, the needle is pressed back, withdrawing the key so that the corresponding punch does not cut. It will be seen that in each of the blank cards that passes into the die, will be cut a series of perforations exactly corresponding to those in the pattern card then on the cylinder at the back of the machine. The pattern cards are passed over the cylinder, in succession, until the entire pack has been repeated, when an exact duplicate pack will have been delivered at the die.



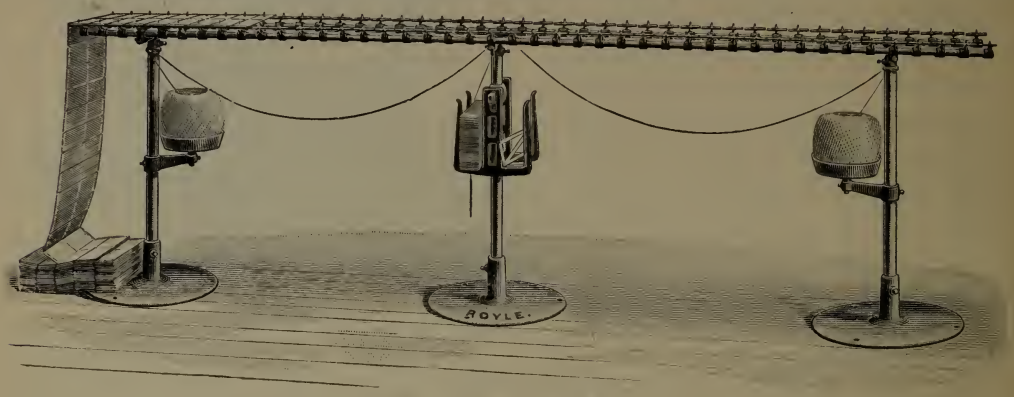
REPEATER.

These machines, despite their complicated mechanism, have been brought to a high state of perfection and work with great rapidity.

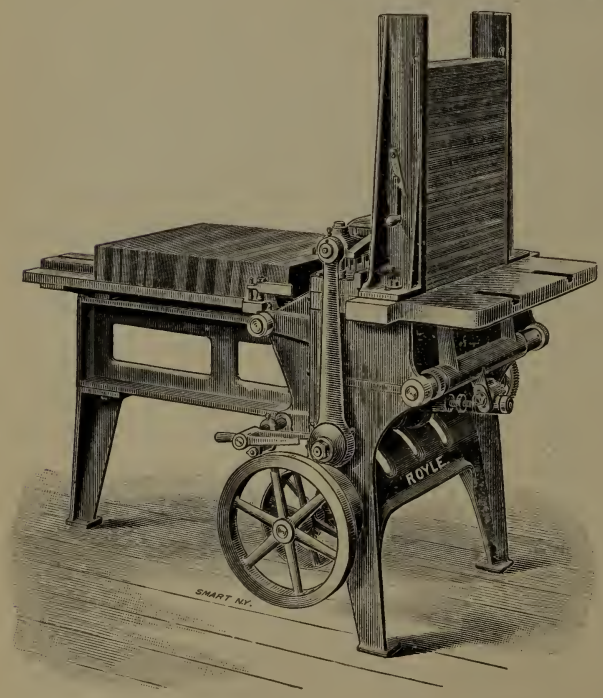
The best repeater made, which is built by John Royle & Sons, Paterson, N. J., will turn out cards steadily, all day long, at the rate of from 40 to 50 per minute. Repeaters are built for all the more important weaving scales. The

illustration shows a machine for cutting French scale cards.

Prior to passing blank cards through the repeater, it is necessary to lace them in packs. There are various ways of doing this and for many years it has been the practice to lace them by hand. This way of doing the work, however, is open to the objection that it is slow and expensive, and the recent introduction of the Royle Automatic Lacer will probably soon lead to the abandonment of hand lacing.



HAND LACING FRAME.

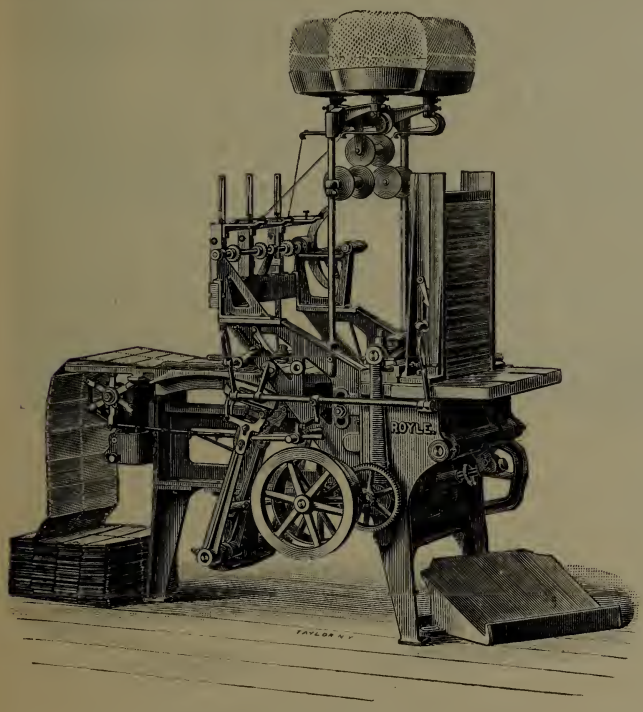


AUTOMATIC PEG AND LACE HOLE CUTTER.

When cards are laced by hand, a frame of wood or metal is used, of a style similar to the metal frame here shown. This frame is filled with cards set on the pegs, which are evenly spaced to accord with the pegs in the jacquard cylinders, and the lacing cord is run through the lace holes by boys. Where hand lacing is employed, it is necessary to first punch the peg and lace holes. For this service, hand-fed punches are used, or else the quicker and more convenient automatic press. Boys are employed for the

lacing and sometimes become quite expert, but the process is essentially a slow one and consequently expensive, and can never be anything else.

A great advance over the lacing frame, is the automatic lacer. This is a highly meritorious machine, of great practical value, which occupies an important place in card cutting economy. It is a machine so simple in design that little need be said about it. The blank cards are piled in the card-guides at the back, from which they are automatically passed into the punching press where the peg and lace holes are cut. The punched cards are then carried forward to the lacing section, where they are laced. In practice, this machine is an invaluable one, as it not alone effects a great saving in wages, but is very economical of room. The lacer most commonly used, makes a lock stitch which runs admirably on the loom. Lacers are also built which make a loop stitch, but this stitch has disadvantages, in practice, which have interfered with its adoption in mills, although the loop stitch lacer has certain mechanical advantages. Lacers are also built for lacing cards in which the peg and lace holes have been punched by the press previously mentioned, but the advantages of the automatic machine are so obvious that separate lacers are being very generally discarded.

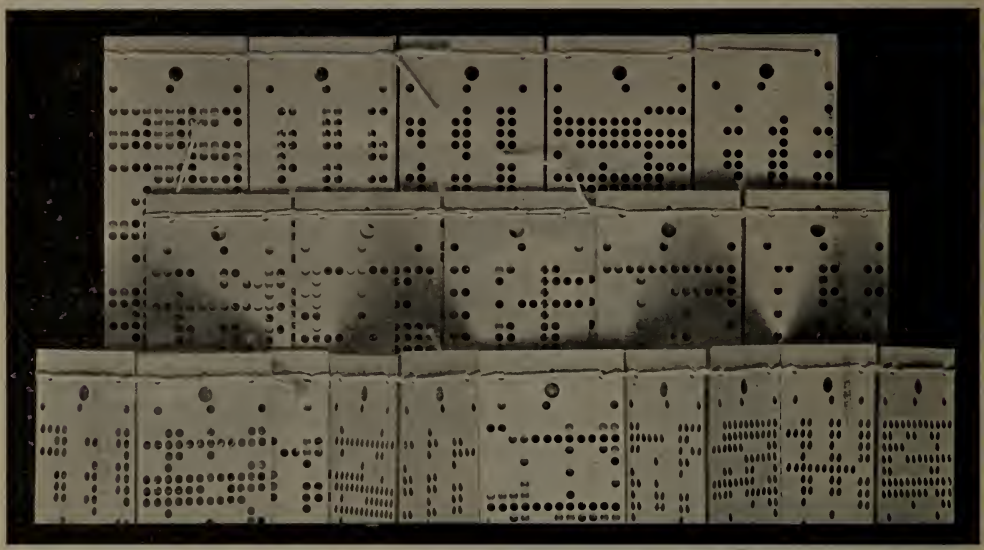


AUTOMATIC, LOCK-STITCH LACER.

The accompanying illustration (see page 8) shows the styles of stitch most commonly used. The upper row shows the stitch of the lock-stitch lacer; the centre row shows a loop stitch, and the bottom row is made up of hand laced cards.

The machines selected for illustration are those built by John Royle & Sons, of Paterson, N. J.,

who are specialists in this line, and to whom is due the development of the devices shown. In selecting an outfit of card-cutting machinery, it should always be borne in mind that the work to be performed is of an exacting nature and none but machines of the most finished construction can be relied upon for satisfactory service. With a well-selected outfit, however, such as can now be readily obtained, the preparation of jacquard cards for the loom become a simple and inexpensive matter.



EXAMPLES OF LACING.

China means to have a powerful fleet, and has been making preparations by first ordering the flags. Given the colors the ironclads will follow, and by way of stimulating the spirit of patriotism and progress, the Chinese government has, it is said, ordered flags enough to deck the combined fleets of England, France, and Italy. This contract goes to Germany, and a well-known flag manufactory in Hanover has been engaged for some months in the production of the new colors for the new navy. The flag bears the Dragon, and is manufactured without any seam, and dyed with chemical dyes.

SOME OF THE SOUTH'S ADVANTAGES OVER THE EAST AS A TEXTILE MANUFACTURING CENTRE.

Since coming East to complete the study of the of the manufacture of cotton, after having spent the greater part of my life in Alabama, I will endeavor to give some general facts setting forth the South's advantages as a cotton manufacturing centre.

I will first discuss the

CLIMATE

as the manufacture of cotton goods depends so largely upon the humidity of the air. The mean temperature of the year is about 15° higher in the South than in the East. During the winter, the temperature is about 20° warmer, and during the summer months, it is about 10 degrees warmer in the South than in the East. The daily range is about the same in both localities. The South, of course, has the longest summer season while the East has the longest winter season. Statistics show that the northern section of the United States has an annual rainfall of about 40 inches, while at the South it is about 56 inches. Both sections have their greatest rainfall reaching in maximum about the middle of summer. This larger rainfall, with higher temperature, gives more moisture in the air in the South ; then too, the dew point is about 11 degrees higher in the South and a given volume of air contains nearly twice as much moisture, but the amount of moisture, which air is capable of holding increases with temperature ; we can therefore say, that although the relative humidity does not greatly differ in each section, it is greater during the summer in the South. It is a fact, that in the East, during the winter periods, that mills which are not provided with humidifyers, become so dry, that machines will not do the work provided for them, on account of being electrified. This is most noticeable in the card and spinning rooms.

The climate not only effects the machinery and the cotton, but affects

LABOR.

In Southern climate, while we have practically eight summer and

four winter months, it takes less clothing, less fuel, and less food than it would in a colder climate; then too, when the days are longer, and the sun rises earlier, the mill help is more willing to get up by daylight than by lamplight and consequently is advantageous to the mill.

It is a noticeable fact that in the East one has to go only for an hour's ride on the electric cars to reach a city of, say fifty thousand people, while in the South, you must go from one hundred to two hundred miles to reach a town of ten thousand inhabitants. In most of the milling towns and cities in the East, you will find not only one, but several mills in each locality; on account of this, the help feel very independent, and will leave a mill for the most trivial thing, knowing they can easily find work elsewhere. This independence leads to labor organizations and from these organizations come the

STRIKES.

These strikes, of course, are a dread to both employer and employee, but on account of the scarcity of mills in the South, and their distance apart, the labor cannot shift from one mill to another, very easily, and strikes are almost unheard of, except in towns where several mills are located.

The following statistics show the comparative cost of labor in each section of the United States, according to the last Government report:

Middle States,	wages	per	spindle,	$6 58
N. Eng. States,	"	"	"	6 47
Western States,	"	"	"	6 08
Southern States,	"	"	"	5 03

FUEL

is one of the most important items in favor of the South. The cost of steam coal is less than one-half of what it is in the East. Coal can not only be obtained at a much lower cost, but it is not necessary to use so much. It must be remembered that it takes quite a quantity of coal to supply the steam that warms the mills in the severe winter months in the East.

Coal is so plentiful in some sections of the South that the mills do not have to go off the premises for their fuel, for it can be mined almost at the mill's door.

CHEAP LAND AND BUILDING MATERIAL.

There are many towns in the South which are offering free sites if mills will only locate there, and some states exempt the mills from taxes for the first ten years. Land

in the South can be secured from say two to ten dollars per acre. Yellow pine lumber can be bought for ten dollars per thousand square feet, whereas in the East, lumber costs more than double that amount. There are very few localities where stone, or clay suitable for making brick, cannot be found. There are many valuable locations where water power can be utilized, and they can be procured at a small cost. Water power costs from $5 to $10 per H. P., while in Lowell it is about $30.

WORKING HOURS.

The Southern mills are allowed to work their help 66 hours per week, against 58 hours per week in the East.

LESS CAPITAL REQUIRED.

It is not an uncommon practice for the Eastern mills to carry a six months' supply of cotton; this necessitates a large capital; and besides this, the cotton must be insured by the mills; to say nothing of the floor space required for storage. In Southern mills where the grade of cotton used is about the same grade all of the time, it is an easy matter to obtain the cotton you want from neighboring cities. The mills usually use the cotton raised in the section in which the mill is located and the cotton from that section is generally the cotton wanted. In this way, the mills get their cotton without having to buy it ahead, thereby requiring less capital stock.

OTHER POINTS.

Another important factor which almost all of the South offers, is the pure and wholesome water. Finest of springs can be found in almost any locality, and it is the case of many of the mills to bore Artesian Wells, which in many cases possess mineral properties.

I find that with a great many people in the East, prevails the idea that the South is very unhealthy, and that they are afraid they will not be able to live there; when the fact is, the South offers as healthy locations as can be found anywhere. There are some low and swampy places, which are not desirable, but capitalists find it is as much to their interest as it is to that of the mill help, to get a location where pure air prevails, and this is an easy matter to do.

COTTON'S HOME

is in the South and there is where the mills belong.

Why not locate where the climate is more favorable?

Why not locate where the help is willing to work longer hours?

Why not go where strikes are less apt to occur?

Why not locate where labor is cheaper?

Why pay transportation on the raw material?

Why pay brokers commissions when you can buy direct from the farmer and from the cotton factor?

Why pay a high rate of insurance while the cotton is in transportation?

Why pay for compressing the bales, which some claim injures the fibre?

Why not go where the fuel, water-power, land and building material is cheaper?

Why not build where less capital is required?

These are a few of the inducements which King Cotton's Home offers.

THOMAS E. MITCHELL.

This story is told of World's Fair Commissioner Peck, during his recent visit in Paris: "Like all Americans, he was not to be put out by trifles. One night an excited bellboy woke him by crying that the hotel was on fire. 'How near is it?' he was asked. 'In the corridor, monsieur, at No. 15.' 'Well, this room's No. 40; call me again when the fire gets to 38.'"

GRIEF.

A maiden knelt beneath a blossomed tree
And wept, alone, in bitter agony.

An angel passing ceased its airy flight
And marvelled at this lovely mortal's plight.

Dost love in vain, the angel whispered low,
Or hast thy love been false, 'tis often so?

Perchance thy love has ta'en celestial guise
And woulds't thou send a message to the skies?

I weep, she sobbed, as well became her kind,
I weep because I've left my pump behind.

Ormsby A. Court.

CIGARETTE SMOKING.

Although much has been written in medical journals and newspapers against the baneful habit of cigarette smoking, it is on the increase. The cigarette smoker as a rule, suffers from cough and other symptoms simulating tuberculosis consumption.

This cough, with the pale face and the disturbed nervous system, marks the victim so he can be recognized anywhere. The lamentable thing about this habit is that once established, it is almost impossible to break from it.

COLORS TO WEAR AND NOT TO WEAR.

"No woman is ugly when she is dressed." Only Lord Chesterfield could have been guilty of such a gallant perversion of the truth.

If he used the word "dressed" advisedly and meant clothed with a due regard to the selection of becoming colors and to the cut and style of the gown to suit individuality of the wearer, he was undoubtedly right—no woman is ugly who is artistically and becomingly dressed. But so few women seem to know what colors enhance or destroy their good looks, what style of gown will conceal their defects and heighten their charms and what way of arranging their hair will improve their faces, that dress ofttimes instead of adding beauty to the appearance has the contrary affect.

People who are florid must be careful what reds they use even more than pale people. A deep blue red, that red suggested in a plum or the velvet leaf of a red pansy that has caught a shade from the petals of its near neighbor the dark blue pansy, is the color for florid complexions. Grown people should be careful not to wear bright red. As Modjeska observes: "As one grows older red is more becoming above the face than below it." Dark cardinal velvet above gray hair and dark eyes has a most charming affect.

Pink is most becoming for fair young people. Rose color, combined with black, white or gray can be worn with impunity by the youthful and fair.

Magenta should be suppressed. Only a dazzlingly beauteous being could survive the uglyfying effect of this depraved color and then it must be combined with white.

Dark sage green is an almost universally becoming color. It annuls any tinge there may be in the complexion; for this reason brunette people generally look well in green.

Only those who have an exquisite complexion should dare to wear pale green. If the complexions are clear, rosy, fair and dark have equal privileges.

Dark green, combined with pale blue, is becoming to brunettes with clear, palid complexions.

Yellow is a delicious color—a favorite hue of the old masters and old Dame Nature. Warm yellow has a good effect on the complex-

ion. It makes the skin look fairer than it really is. It goes pleasingly with many colors. A brunette will look particularly handsome in a green yellow.

Mustard color, which is insufferable by daylight, is simply delicious in the gaslight. Pure blue and yellow is harsh. A good rule is never to combine two colors of equal intensity. One of two colors should be dull and not too pure.

Yellow will blend well with old gobelin blue, with heliotrope and certain shades of blue grays. Amber of all shades is exceedingly becoming to dark people.

People with blue eyes should not wear bright blue. It makes their eyes look faded and detracts from the bloom of the complexion.

Black should be worn advisedly by both old and young. The young can wear it better than the old. It brings out clearly the hard lines in the face and seems to deaden the bloom of the skin. Golden-haired blondes, red-haired maids and matrons and dark people with clear, rosy complexions can wear black and look well. All others can modify its hardening effects by combining white, red, orange, gray or yellow with it.

All but people with very coarse complexions look well in white.

Every color can be made becoming by being artistically arranged and relieved by another color, or by the soft, subduing effects of net or lace or airy tulle.

The November statement of exports from Great Britain to the United States, which has just reached the treasury bureau of statistics shows in nearly every case that the exportations of manufactures in the 11 months ending Nov. 30, were less than in the corresponding months of earlier years. Imports of manufactures in the early part of the year 1897, were, of course, abnormally great, and a comparison of the 11 months of 1898 with the corresponding months of 1897 would in many cases be misleading. A comparison, however, with the corresponding months of 1896 and 1893 shows in nearly all cases smaller imports in 1898 than in either of the earlier years. When it is remembered that the imports of the 11 months of 1896 were the smallest with a single exception since 1890, and that these of 1893 were less than in the three years which preceded it, a comparison of 1898 with these two years will not be considered an unfair one, while to compare with the years 1894 or 1897, in which tariff laws were being considered and enacted would be manifestly unjust. — *Boston Herald.*

SIMPLE LESSONS IN PHOTOGRAPHY.

The method now to be described is one of several hundred different systems of development employed, for nearly every worker, while giving general adherence to a formula, appears to make some slight departure from its strict letter in order to suit his own special requirements.

But pyrogallic development is universally based upon one principle, namely, the employment of pyrogallic acid dissolved in water together with an alkali. As regards the latter, some prefer ammonia, others one or other of the fixed alkalies, carbonate of potash, carbonate of soda, or carbonate of ammonia, or sometimes a mixture of two or more of these.

At this stage we do not wish to hamper the mind of the beginner by presenting to him a number of developing formulas, but shall content ourselves by giving him such simple directions by which to develope a negative as will render it well-nigh impossible for him to fail.

In a bottle or vessel of any kind—a glass tumbler, for example—place a dessert spoonful of common washing soda, previously crushed, and to this add a quantity of water not quite sufficient to dissolve it, if it does, add more soda, till the water will dissolve no more. In another vessel do precisely the same, but substituting carbonate of potash for the soda salt. Now take a bottle having a turnover lip and a nicely fitting cork, and pour into it equal quantities of the two saturated solutions described, and for each ounce of this mixture, whatever the quantity may be, add 12 drops of strong liquid ammonia.

You have now a stock alkaline solution which is always ready for use, and will last a long time, as it has to be used very sparingly. The vessels in which the solutions were prepared may now be washed out.

Just before developing, and having ascertained the quantity of water to cover a plate when lying in the developing dish, and which may be one, two or three ounces according to the size of the plate, dissolve therein pyrogallic acid in the proportion of two grains to each ounce.

Place the plate in the dish, face up, and pour over it the pyrogallic solution, taking care that it is made to flow over and wet the surface thoroughly, thereby, avoiding air bubbles, which would show eventually as white spots on the negative.

The pyrogallic solution, having been allowed to act on the plate for a minute or more, is poured into a glass measure, into which two drops of the alkaline solution have been previously dropped from the stock solution.

This alkaline pryro solution is poured over the surface of the plate, and a sharp look-out kept for the appearance of the image.

Do not get flurried or impatient should the image be slow in appearing; but if an unusually long time, say two minutes, elapses without the image coming, it may be necessary to add one or two drops more of the alkaline solution; it is wise, however, to do this cautiously, for, if too much is added, the negative may develope with an unmanageable degree of rapidity.

After the details are well out, let the development be continued until they seem to disappear, leaving nothing but the very deepest shadows white; then remove the negative, wash it in running water, and transfer to the hyposulphite of soda fixing bath made in accordance with previous directions.

Another formula is a great favorite with the writer, who finds, however, that there are some otherwise good plates in the market for which it is not well adapted, as the gelatine films pucker up under its action—for such, ammonia is recommended as the alkali to be put into the developer.

Make two solutions as follows:

SOLUTION A.

Sulphite of soda . . .	6 ounces
Hot water (distilled) .	32 "

Make slightly acid with citric acid, and when cold add—

Pyrogallic acid . . .	1 ounce

SOLUTION B.

Carbonate of soda . .	3 ounces
Carbonate of potash .	1 "
Water (distilled) . .	32 "

To develope, mix equal parts of A and B, then add two parts of water.

It is sometimes desirable to add double the quantity of water, especially if the exposure has been very rapid.

Of the hydroquinone, likonogen and other developers, we shall at present not describe inasmuch as the beginner will not yet have arrived at that stage which fits him for understanding their proper positions in negative developments, and we shall therefore conclude this chapter by recommending him to adhere to pyrogallic development until he has mastered it, and when he has done this he will be competent to judge if the value of other systems of developing the photographic image.

The next chapter will be devoted to under and over exposure.

THE LOWELL TEXTILE JOURNAL.

A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager.

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid $1.00
Single Copies 10
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the twenty-fifth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

If you have any ideas that may make interesting reading for your fellow students and friends, send them to the Editor of the Journal.

. . .

We don't try to please everyone, but if there is anything about the Lowell Textile Journal you don't like, don't hesitate to tell us.

. . .

Here are some strong characteristic words: ambition, aggressive, inquisitiveness, tenacious, loyal, suggestive, self-reliant.

Good work will get its commendation.

. . .

It is a false parsimony which believes that "it's good policy to get all you can out of your help."

. . .

Don't expect to be educated by other students—hump for yourself.

. . .

Think before you oppose or suggest.

. . .

The Polytechnic School in Hanover ranks as one of the most important in Europe, it was organized June 15, 1835.

. . .

Amongst numerous other objects, skins, furs, and leathers, wools raw and manufactured, silk and silk fabrics, cotton raw and manufactured, linen in all its different stages from the plant to the finished product, paper and fibrous grasses, wood, etc., these placed around the Textile School, their names and some few particulars appended must attract attention, this silent teaching would go imperceptibly on.

It is impossible to understand clearly the action of any machine without a knowledge of its various parts.

. . .

The Dominion of Canada has an area of 3,382,000 square miles, and comprises one-sixteenth of the land surface of the globe.

. . .

Does it not appear a mystery? The woolen cloth exports of Great Britain to the United States have fallen off more than four-fifths since the year 1896 and still our woolen industries have not had orders to keep their mills running on full time.

. . .

The Fall River Weavers' association acknowledge the necessity of Textile Schools by the fact that they have inaugurated a school for their own instruction. We wish them success.

. . .

The old saying, "figures will not lie." Woolen cloth imports from Great Britain 1893, 2,363,800 yards; 1896, 10,458,800 yards; 1896, 1,478,300 yards, a falling off of 8,980,500 yards since 1896.

Favorable reports come to hand. We may have a boom in the woolen and cotton industries.

. . .

Our mills have not made up the deficiency, therefore, there must be under consumption.

. . .

A workman may be skillful in manipulative ability, and, yet have neither the power nor intelligence to describe the why and wherefore of any process or parts of the machine he may be operating.

. . .

Every textile student, textile manufacturer, merchant and dry goods man, should read the Leeds letter in the Cotton and Wool Reporter. A copy of the letter will be found elsewhere in this Journal.

Parsimony, and not industry, is the immediate cause of the increase of capital; industry, indeed, provides the subject which parsimony accumulates; but whatever industry might acquire, if parsimony did not save and store up, the capital would never be the greater.—*Adam Smith.*

LEEDS LETTER.

From American Cotton and Wool Reporter.

LEEDS, Eng., Dec. 3, 1898.

I have seen a large number of samples recently of cloths which the English and Continental makers have got out for the men's wear trade for the fall of 1899. During many years' experience in the textile trade I never saw such a paucity of new styles. There is hardly a cloth or a design which strikes one as new, either in Scotch cheviots or fancy worsted suitings. The tendency in all kind of fancies, whether of carded or combed yarn, is for "grays," chiefly of a medium tone of clear silver gray. In the ranges of cloths I have seen, there is one very distinctive feature, and that is a striving after cheapness, and really some most wonderful values are seen. What do your makers say to

AN ALL WOOL MIXTURE

overcoating, 30-ounce, at 62 cents a yard, with a beautifully soft handle, and Scotch cheviots at under 75 cents, 56 inches? A few years ago a Scotch maker would have been insulted if he had been asked to make a fall weight at much under $1 a yard; but the keen rivalry and excellent work of the Colne Valley manufacturers have driven the "aristocratic" Scotch maker to come down in price or lose his business. There are some most excellent goods made this season in this district in fancy Saxony suitings, at 36 cents, 22-ounce. How on earth these people make them at a profit is a mystery. The secret is that a strong cotton thread is twisted with cheap shoddy, which of itself will scarcely hold together. The cotton thread in the twisting process embedded in the centre of the yarn, and

IS OUT OF SIGHT,

consequently when the piece is made, the cotton can only be detected by untwisting a thread, and the fabric has the appearance of an all wool cloth. I remember on one occasion an American buyer showing me some very pretty cloths which he had bought in New York, and which he said were all wool. I had my doubts, and obtained permisssion to dissect a sample. Each thread I took out revealed the cotton yarn snugly lying in the centre. My friend, who professes to be very cute, at first argued that this was some new material, not

cotton, but when I offered to introduce him to a firm who would sell him the same goods at 18 cents, a yard less than he paid for his purchase, he began to see that

HE HAD BEEN SOLD.

Even a little knowledge of designing and manufacturing would have saved that man a good deal of money, as he had bought a lot of those goods. When one comes across such cases as this, it illustrates the advisability of woolen merchants and buyers having some degree of technical training. If the technical colleges which are in existence, and those being formed in America, were to have classes for merchants and buyers, I am certain it would supply a necessity in the trade. Such classes have been a success in this country. The only trouble is, that some buyers cannot be taught anything.

TO GIVE ANOTHER CASE,

whereby a little scientific knowledge, had it been possessed and applied by a certain woolen buyer in the Midlands, would have saved his firm a good deal of expense and loss of reputation. Last week, after the heavy snowfall we had here, a number of men were set to work in Birmingham to clean the streets. The men were supplied with overcoats, which, on becoming soaked by the sleet and rain apparently gave off a poisonous gas. As a result about 60 men are suffering from poisoned hands and arms at the hospital. A chemical examination of the cloth from which the coats were made revealed the fact that

CHLORIDE OF ZINC

was present in the fabric. This had been put in to add weight to the cloth, so as to get the contract at a lower price than other makers who give honest weight. The consequence is, as stated, that all the 300 garments are returned to the maker, with claims for coats which are useless. The buyer for this clothing firm, if he had possessed technical knowledge, could have discovered this decoction of shoddy and chloride of zinc. I wonder how much chloride of zinc was paid for by American clothiers, as cloth under the Wilson bill? What can be the answer, when we think of all the beavers sent in, costing here 26 a yard, 26 to 28-ounce?

Technical education . . . means that sort of education which is specially adapted to the needs of men whose business in life it is to pursue some kind of handicraft. —*Professor Huxley on Technical Education.*

LOWELL TEXTILE JOURNAL.

WM. R. MOOREHOUSE, Sub Editor.

CLASS ITEMS.

The year 1899 has commenced at Lowell Textile School.

. . .

Examinations were held from Jan. 23rd to Jan. 30th inclusive.

. . .

People who succeed without trying are fewer than those who try without succeeding.

. . .

To be a good "brick" a man must be made of the right sort of clay and have considerable "sand."

. . .

The Lowell Textile and the Rogers Hall Schools are "THE" schools of the city, and some of the Textile students would like to see them united as one.

. . .

Some of the Textile students are often seen on Fort Hill; we wonder why?

. . .

Mr. C. W. Collins intends to leave the Textile School at the end of the term and go into business at Providence, R. I. We all wish him success.

ARE SECOND THOUGHTS BEST?

Really and truly, what are second thoughts? Virtually they are part of the original thought, and not second thoughts at all; they are, says a doubter in their efficacy, in a manner the drag on the wheels of the original thought. They only arise out of the process of reasoning out the first thought or prompting, of which they become the offspring, and sometimes a very weakly and feeble offspring, too, without any vigor and virility of the original idea. Our own opinion is that so-called second thoughts are not best, and the very fact of a man indulging in second, or third, or fourth thoughts would seem to us to indicate some amount of vacillation and irresolution on his part. We venture to make the assertion that most truly great men have been quick thinkers, men to whom thought came as a flash, to be acted on promptly, and not to be frittered away by admixture with inferior and diluted thoughts.

WEAVING SET TO MUSIC.

At Soka, about half a dozen miles from Osaka, and some other towns in Japan, carpets, rugs and fabrics of the same class are extensively manufactured. There are no large carpet factoriess, but hand looms may be seen in nearly every house. The weaving process is set to music. The children are taught to sing a sort of nonsense verse to a certain tune, the superintendent or head worker leading, and that air means a certain pattern, the deft fingers of the little workers rhythmically following the notes. At the right moment the woman in charge of a loom changes the tune, and the little ones instantly take it up and as quickly change the pattern to suit the music. It is consequently quite correct to speak of these productions as a "one tune," "two tune" or "four tune" carpet.

Pearson's Magazine states that the actual workers are, for the most part, children of from seven years upward, and from two to four, five or even six work at a single loom under the direction of an adult, generally a woman Some 5,000 boys and 13,000 girls are thus employed. — *Southern and Western Textile Excelsior.*

Advertise in the Journal.

From the Boston Herald we obtain the information that there is a great falling off of importations of worsted, woolen and cotton manufactures, also of wool, worsted and woolen yarn, and textile machinery. The figures show a large reduction since the year 1896.

	Eleven m'ths 1896.	Eleven m'ths 1898.	Decrease
Textile machinery	£459,973	£259,921	£200,052
Apparel	64,587	47,750	16,837
Wool, pounds	7,550,000	4,331,000	3,219,000
Cotton piece goods, yds	50,180,300	43,905,800	6,274,500
Jute manu'ng, yds.	122,915,500	95,287,300	27,628,200
Linen manu'ing yds.	90,804,200	78,966,700	11,837,500
Wool and worsted yarns	424,000	109,800	314,200
Woolen cloth	10,458,800	1,478,300	8,980,500
Worsted cloth	30,505,300	12,706,400	17,798,900
Carpets	438,700	192,300	246,400

In this issue of the Journal appears an article on "Some of the South's advantages over the East, as a Textile Manufacturing Centre." The article is a mass of facts and should be carefully considered by our Eastern capitalists. Mr. Mitchell, the writer, comes from Mobile, Alabama, to Lowell to complete his textile education. He has taken a year and a half's course in the Lowell Textile School with distinction. He has had thorough practical work in almost every department of one of the largest cotton mills in the East, and with his unswerving energy and gentlemanly bearing we predict for him one of the brightest of futures.

C. G. SARGENT'S SONS,
GRANITEVILLE, MASS.
Builders of Wool Washing Machines, Wool, Waste and Rag Dusters, Duplex Burr Pickers, Waste Cards, etc.
Write for information concerning our new Automatic Cotton Dryer.

RAMIE.

Plant Which Puts Inventive Science at Fault.

One of the most interesting problems of the day in the utilization of the new fiber material, and one that is attracting the attention of all civilized countries, is the industrial production of that wonderful substance known in the Orient as China grass, in India as rhea, and in Europe and America as ramie. The money spent by governments and by private enterprise throughout the world, in experiments and in inventions, in the efforts to establish the ramie industry, would make up the total of a princely fortune. Obstacle after obstacle has been overcome in the years of persistent effort, and now we stand before the last barrier, baffled for the time, but still hopeful, and with efforts unrelaxed. The difficulty may be stated in a few words—ramie culture will only become a paying industry when an economically successful machine for stripping the fiber has been placed on the market. Hundreds of thousands of dollars have been spent in efforts to perfect a machine, but no government fiber expert in the world recognize that we have such a machine at the present time, though great progress has been made in machine construction.

The world's interest in this fiber began in 1869, when a reward of £5000 was offered by the government of India for the best machine with which to decorticate the green stalks. The first exhibition and trial of the machines took place in

LAMINAR FIBRE CO.
MANUFACTURERS OF

Roving Cans, Boxes, Trucks,

And all Forms of Mill Receptacles.
Office and Factory, Tannery Street, North Cambridge, Mass.
L. D. Telephone, Arlington, 44.

1872, resulting in utter failure. The reward was again offered, and in 1879 a second official trial was held, at which ten machines competed, though not one filled the requirements, and subseqently the offer was withdrawn. —*Popular Science Monthly*

NEW HOTEL RULES.

A Georgia landlord adopted them. It is not stated what the guests thought about them.

A hotel in Georgia has adopted the following rules for the guidance of its guests:

The motto of the hotel is: "Do unto others as they will do you."

There are three departments—upstairs, downstairs, and out doors. Out doors is the cheapest.

If the bell in your room is broken, wring the towel.

"God helps those who help themselves," but God help those get caught helping themselves here.

No alarm clock furnished by the management. Before retiring wind up your bed and hear the ticks.

To prevent guests from carrying fruit from the table, we will have no fruit.

Any one wishing to take a drive after lunch can repair to the woodshed and drive nails.

Guests having night-mare will find a harness in the woodshed.

Thirteen at the dinner-table is a bad sign. It is a sign that we will have no supper.

Each room supplied with a handsome chromo card with the following inscription: "Honesty is the Best Policeman."

If the hotel is not on the right side of the street, let it be known at the office and it will promptly be removed to the other side.

No spoons allowed on the table occupied by newly married couples. This is to prevent spooning in public.

Guests are not expected to pay their bills unless they prefer to do so We have seen a tree "leave its trunk for board."—*Houston Post.*

The ways to enrich are many, . . . parsimony is one of the best, and yet is not innocent, for it withholdeth men from works of liberality and charity.—*Bacon.*

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THE LOWELL TEXTILE JOURNAL

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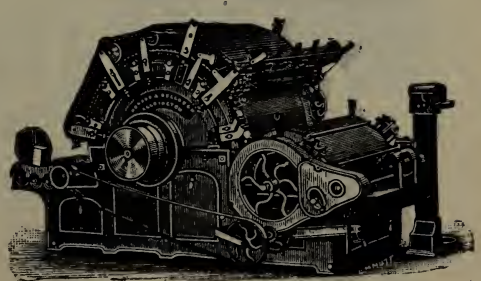
IMPORTERS AND BUILDERS OF
COTTON, WOOLEN, and WORSTED MACHINERY
CARD CLOTHING,
EGYPTIAN COTTON, Etc.

LOWELL TEXTILE SCHOOL ART DEPARTMENT.

Mr. Vesper L. George, instructor in art in the Lowell Textile School, has an interesting class of 13 young men and women. The primary object of the directors, in establishing the art department in the school, was to instruct the students in decorative art as applied to textile design with the purpose of elevating the standard of design in the markets of the United States. The study of historical ornament is pursued in the school, not for the purpose of imitation, but to bring out the thought that actuated the work, thus encouraging original design. Beginning with the simplest forms, the pupils are led up to the use of natural objects in the formation of original designs according to the best rules of art.

The instruction, however, is not entirely confined to textile designing. Some of the pupils are studying for the purpose of becoming designers of wall paper, of taking up interior decoration, or illustrating. A large part of the instruction is as applicable to one purpose as to the other, the same principles of art applying in all cases. In each department, it is simply a question of recognizing the limita-

STUDY
the points of our different machines and compare with others.
UNDERSTAND
the merits and you will be convinced beyond a doubt of their superiority.
HOWARD & BULLOUGH
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Acids, Dyewoods, Chemicals,

Drugs, and Dyestuffs Generally.

8 to 44 MIDDLE STREET. LOWELL, MASS.

tion of that particular industry. It is the design of the instructor to teach pure art, in the purest way.

During the Christmas season, the pupils were required by Mr. George to prepare some book-cover designs, from entirely original ideas, suitable for the Christmas numbers of magazines. The result is a collection of work that does credit to the pupils and their teacher. All of the designs have merit, and there is one in particular that is decidedly good. It is designed for "The Story Teller," and is by Miss Amy Goodhue of Dracut, one of the most promising pupils in the class. The background of the cover is all in dull pale green, and around the edge is a border of holly leaves and berries, in conventional design, the rich green and scarlet contrasting beautifully with the dull background. In the centre is a simple farm house, nestling in a quiet valley, and above, coming down from the frozen regions of the north on the rays of the aurora borealis, is Santa Claus in his sledge, drawn by eight reindeer, whose hoofs and harnesses are tipped with silver. The design is dainty and suggestive, and the thought is good.

Mr. George is very proud of his class, and says that they are doing good work.



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TEXTILE DESIGNING.

From FIBRE AND FABRIC.

At the Yorkshire college, Leeds, Eng., a lecturer recently gave some very good hints which young cloth designers would do well to consider. It was his advice to students to first find out whether they were interested in designing before adopting it as an occupation; if it was not to their liking, it would be impossible for them to become successful designers. If they found that the work was a congenial one, it was necessary for them to concentrate their undivided attention upon it and learn how to design properly; not to become discouraged by difficulties, but rather to let them be an incentive for harder work.

The first point is perhaps the most important. If we start on the wrong track and find that we have not the natural ability and taste for the line of work chosen to keep up with those who are better adapted to it, the sooner we switch off on to something else the better.

The boy who cannot make a success of designing may have qualities which, if rightly used, will enable him to finally take a position among the most expert machinists or in some other work to which his fancy leads him. Concentration of effort, however, is necessary whatever trade may be taken up, and in these times of

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competition in labor considerable study is necessary for one who expects to become a first-class workman.

The young man who starts in to learn his trade expecting knowledge and promotion to be thrust upon him will never succeed. He needs to be shown what to do; after the novelty wears off, his work becomes to him a monotonous, mechanical operation, requiring no mental exertion; he waits anxiously for bell time, and with his mind on anything else but that it is essential to become proficient in his present position before being given a greater trust, it is not difficult to understand how he makes slow progress, or perhaps decides he will try something else, Usually this boy has someone to fall back on, someone to feed and clothe him if he cannot do it himself. Such boys are sometimes quite wise (?) young men before they realize that they have wasted years that might have been used to better advantage, and that it is important to settle down to business and make a success of something. It is frequently thus with the young man who decides to learn designing. He thinks it is a "snap" to sit at a table and draw pretty patterns, and then with tables and other data to lay out the work for the dressers and weavers. On the other hand, one who is ambitious and has a natural ability for



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THE LOWELL TEXTILE JOURNAL

W. I. HERVEY, D. D. S,

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work does not always know how is the best way to learn designing.

When he seeks advice from successful men he is often met with discouraging arguments; they tell him there is no money in the business now and something else would pay better. If he persists in his determination they are willing to give him very little help. However, with the aid of the textile journals, a few tools and plenty of samples, the young man who is in earnest can make fair progress, and if it is particularly to his liking he finds that the study is a very fascinating one. By picking out and copying patterns he soon gets some knowledge of weaves and combinations of color, sizes and kinds of yarn, etc. How long he continues to be copyist depends upon his own ingenuity, but whether working with copied designs or original patterns, it is important to have a book in which they may be recorded, for what is understood now may be wholly or partially forgotten later on, and the act of making a memorandum of it impresses it more firmly on the mind. To keep posted as to what are the most popular fabrics and what are likely to become so is of the greatest importance. The designer who keeps in touch with tailors and clothiers, and knows what are the general lines of goods that are apt to please the public fancy, and who has the knowledge and ingenuity to produce novelty weaves and colorings in the lines indicated, is the one who is worth most to his employer and whose creations are seldom found unsaleable. To be able to copy even the most difficult fabrics is of course essential, but it counts for little in the man-

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ufacture of fancy goods unless backed by originality that can bring out new ideas or put old ideas into such shape that they will be up to date and attractive. Knowing that it is not very easy to get help from those who could help us most, I would like to see more beginners write for your paper. An exchange of ideas and perhaps some patterns would be of considerable assistance to some, including HOMESPUN.

WOOL FROM PINE NEEDLES.

Most men would as soon think of gathering figs off thistles as wool off pine trees, yet that is just what the promoters of a new Oregon industry proposes to do. Mr. and Mrs. D. A. Cords are establishing a plant at Grant's Pass for the manufacture of pine needles into a fabric very like woolen cloth. It has been carried on in Europe for years.

Mr. and Mrs. Cords are enthusiasts, but are practical-minded withal, and do not propose to start in on too large a scale. They intend first to make material of the consistency of excelsior for mattresses; after that they will manufacture the wool which is used for underclothing, bandages and other purposes where a soft and pliable fabric is required. Only the inner fabric of the needles can be used for the latter, and the process is expensive, but not more so than that of the manufacture of lambs' wool.

Mrs. Cords is familiar with the process of manufacturing fabrics from pine needles in Germany and France. The machinery has to be imported.

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CORRESPONDENCE—QUESTIONS AND ANSWERS.

Under this head, as stated in a previous number, it is intended to continue correspondence month by month, and the columns will be open to all subscribers.

Letters may be addressed to the editor upon any subject which may be considered of importance to the readers of the Journal, or which may possess general interest.

The freest discussion will be invited, and the more readily the readers enter into those discussions the more valuable they become, both to themselves and to their fellow readers.

Letters under this head must be addressed

THE EDITOR,
Lowell Textile Journal Co.,
67 Middle street
Lowell, Mass.

LOWELL, Mass., Dec. 9, 1898.
Editor Lowell Textile Journal.

DEAR SIR.—Is it possible for a beginner to learn textile designing by correspondence, if so, what would be a reasonable amount to pay for such lessons?

Thanking you in anticipation for this favor.

Believe me, yours respectfully
"UN AMI."

"UN AMI."—Replying to your query. There are correspondence schools for all classes of studies. Law, journalism, photography, chemistry and a host of others, why not in designing? The progress all depends upon the student. The textile schools, day or evening are within reach of you. You would benefit by having one year if you cannot afford more time. The second part of your letter we cannot answer.

EDITOR LOWELL TEXTILE JOURNAL.

LAWRENCE, Jan. 2, 1899.
Editor Lowell Textile Journal.

In the course of a lecture on wool by Professor Umpleby at the Lowell Textile School, he spoke about abb wool and abb yarn, referring to some old methods of naming different qualities and kinds. Will you explain the full meaning of the term "abb" as used by the instructor in the woolen department.

Yours truly, B. B.

B B.—The name "abb" as applied to wool was of general use among the wool sorters or wool staplers of Europe—ab is Anglo Saxon for aweb—woof. From another form of aweb, namely, owef comes the English word, woof, and at this time the word woof meant the filling, the contraction of the first and last letters of aweb, ab, meant warp—thus we have abb wool, or wool for the abb or warp of a web—in wool sorting, one of two qualities of wool known as coarse abb and fine abb respectively.

EDITOR LOWELL TEXTILE JOURNAL.

LAWRENCE, Mass., Dec. 7, 1898.

DEAR SIR,—Is it possible for a boy who has been to the Yorkshire college for one year as a student in the textile department, to give lessons in textile design?

I know of a young man in this country who went to England for one year, came back to this country, has had two or three situations and could or did not keep them, and now he is setting himself up as a professor of textile design. Is it not time that such frauds should be exposed?

Yours truly, T. B.

T. B. — Perhaps the young man was a good designer when he left this country and went to England to finish his education at the Yorkshire collhge, if so, he would be able to give what he had received. As to the second part of your letter, I know of men giving lessons in textile designing, who could not give the analysis of any piece of cloth.

EDITOR LOWELL TEXTILE JOURNAL.

LOWELL, Mass., Dec. 8, 1898.

Editor Lowell Textile Journal.

DEAR SIR,—Would you kindly reply in your issue if you know of any book on reed and harness making, and which book is the best on weaves and textile design, price and publisher, also say which work is best on elementary color.

And oblige, yours respectfully,

HAND LOOM.

HAND LOOM,—We do not know of any book that is devoted to reed and harness making.

Posselt's Technology of Textile Design and Baldwin's, The Self-instructor in Textile Designing are two of the best works on weaves and design.

We can reccommend Elementary Color by Milton Bradley, all of which may be had at this office.

EDITOR LOWELL TEXTILE JOURNAL.

LOWELL, Mass., Dec. 8, 1898.

Editor Lowell Textile Journal.

DEAR SIR,—Please to give the title of a good book on carding, also the name of a first-class book on worsted spinning.

Yours sincerely,

WORSTED.

WORSTED,—Wool-Carders' Vade Mecum, by Bramwel, is the best American work on carding.

There is a good book on spinning woolen and worsted by McLaren. Can be obtained at this office.

EDITOR LOWELL TEXTILE JOURNAL.

LOWELL, Mass., Dec. 12, 1898.

Editor Lowell Textile Journal.

DEAR SIR,—Would you kindly disect the cloths enclosed and give me the plan and name of the cloths.

Yours respectfully,

A. J. B.

A. J. B.—We cannot do this publicly. If you wish, we can place them in the hands of experts, who will do it for you on the usual terms.

EDITOR LOWELL TEXTILE JOURNAL.

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THE LOWELL TEXTILE JOURNAL

Lowell Textile Journal

THE MERCERIZATION OF COTTON.

From the AMERICAN COTTON AND WOOL REPORTER.

The dyeing and finishing trade has witnessed many remarkable developments within recent years, but it is questionable whether for some time there has been any one which will eventually be found to equal in importance in its bearing upon the general textile trade, the recent applications of the old mercerizing process which have practically enriched the trade with a new fibre possessing most valuable properties.

The peculiar action which strong solutions of sodium hydrate have upon the cotton fibre, and which is the basis of all the processes treated of in this article, was first noticed by Mercier in 1845 or 1846, and only one of many important discoveries made by this remarkable man, respecting whom a few words of biography will perhaps be of interest.

JOHN MERCER.

Born in 1791, John Mercer, was, as a chemist, entirely self-taught, being by trade a hand-loom weaver. His first connection with the dyeing trade came about by his entering the color shop in the Okenshaw Print Works as a workman, a few years after which he discovered a process for producing golden antimony sulphite on cotton. After being appointed experimental chemist to the works, he rapidly introduced several new styles in calico printing, among the most important of which may be mentioned chrome yellow, chrome orange and manganese bronze, and the chromic acid and red prussiate discharges for indigo blue. Mercer also first prepared "sulphated oil" and thus revolutionized the Turkey red industry, and devised the "blue-print" pho-

tographic process, which is so largely used for reproducing drawings, etc., at the present time. He also was the first to put forward a suggestion of the germ theory of disease, this being long prior to the work of Pasteur or Koch; and in 1853 he put on record views on technical education which might, even now, be studied with advantage. His contributions to chemical theory and practice were very numerous and important, and he devised and improved several pharmaceutical preparations. In 1852 Mercer was elected a Fellow of the Royal Society, and in 1864 this many-sided man died.

THE ORIGINAL MERCERIZING PROCESS.

Although first noticed in 1845 or 1846, the mercerizing process was not patented or made public until 1850. It was illustrated at the first International exhibition in 1851, and proved a very attractive exhibition, being awarded a council medal. At the close of the exhibition many of the exhibitors desired to present articles to the Queen, but all were declined with two exceptions, one of which was some articles prepared by the mercerizing process. With the public interest thus aroused and stimulated, a great and immediate commercial success was anticipated for the process, and it is on record that a French company offered the sum of £40,000 for the patent right, which was refused. However, on account of the cost of the caustic alkali and the loss entailed by the shrinkage of the material, the process was never in Mercer's lifetime, of much practical value in dyeing or printing, although it was largely used in a modified form in the preparation of a toughened paper called "vegetable parchment."

The specification of Mercer's patent runs as follows:

MERCER'S PATENT.

"Improvements in the preparation of cotton and other fabrics and fibrous materials," by John Mercer, Eng., Pat. 1850.

"My invention consists in subjecting vegetable fabrics and fibrous materials, cotton, flax, etc., either in the raw or manufactured state, to the action of caustic soda or caustic potash, dilute sulphuric acid or chloride of zinc, of a strength and temperature sufficient to produce the new effects and to give the new properties, which I have hereinafter described.

"The mode I adopt of carrying into operation my invention to cloth made from vegetable fibre and bleached, is as follows: I pass the cloth through a padding machine charged with caustic soda, or caustic potash of specific grav-

ity say 60 to 70 degrees Tw., at the common temperature, say 60 degrees Fah. or under, and without drying the cloth wash it in water, then pass it

THROUGH DILUTE SULPHURIC ACID

and wash it again; or run the cloth over and under a series of rollers in a cistern with caustic potash or soda of specific gravity from 40 to 50 degrees Tw., at the common atmospheric temperature. The cloth then passes over and under rollers placed in a series of cisterns charged at the commencement of the operation with water only, so that at the last cistern the alkali has been nearly all washed out of the cloth. When the cloth has either gone through the padding machine or through the cisterns above described, I wash the cloth in water, pass it through dilute sulphuric acid, and again wash in water.

When I adapt the invention to gray or unbleached cloth made from vegetable fibres, I first boil or steep the cloth in water, so as to have it thoroughly wet, and remove most of the water by the squeezer or hydo-extractor, and then pass the cloth through the soda or potash solution, etc., as before described.

"I apply my invention in the same way to warps, either bleached or unbleached, but after passing through the cistern containing the alkali, the warps are either passed through squeezers or through a hole

IN A METALLIC PLATE

to remove the alkali, and then passed through the water cistern, soured and washed, as before described.

"When thread or hank yarn is operated upon, I immerse the thread or yarn in the alkali, and then wring out as is usually done in sizing or dyeing them, and afterwards wash, sour, and wash in water, as above described.

"When cloth made from vegetable fibre, cotton, flax, etc., has been subjected to the action of soda or potash, as above described, by padding, immersion or in any other way, and then freed from alkali, the cloth will be found to have acquired certain new and valuable properties the more remarkable of which I here describe. It will have shrunk in length and breadth, or have been less in external dimensions, but thicker and closer, so that by the chemical action of soda or potash I produce on cotton or other vegetable fabrics and fibres effects

SOMEWHAT ANALOGOUS

to that which is produced on wool by the process of fulling or milling.

It will have acquired greater strength and firmness, each fibre requiring greater force to break it. It will also have become heavier than it was before it was acted upon by the alkali. It will have acquired greatly augmented and improved powers of receiviug colors in printing and dyeing. The effects upon the vegetable fibres in any of its various stages before it is manufactured into cloth, will be readily understood by reference to its effects upon cloth composed of such fibres.

"Secondly I employ sulphuric acid diluted to 105 degrees Tw., and at 60 degrees Fah. or under. I use this acid instead of soda or potash, and operate

IN ALL RESPECTS THE SAME

as when I use soda or potash, except the last souring, which is here unnecessary.

"Thirdly, when I employ solutions of chloride of zinc, instead of soda or potash, I use the solution of specific gravity 145 degrees Tw., and at 150 to 160 degrees, Fah., and operate the same in all respects as when I use soda or potash.

"When I operate on mixed fabrics, partly of vegetable and partly of silk, wool, or other animal fibre, such as delaines, I prefer the strength of the alkali not to be over 40 degrees Tw., and the heat not above 50 degrees Fah., lest the animal fibres should be injured.

"I may, in conclusion, remark that the construction of the apparatus or machinery, and the strength and temperature of the soda or potash may be varied to a considerable extent. For instance, caustic soda or potash may be used even as low as 20 degrees Tw., and still give improved properties to cloth, particularly if the temperature be low, for the lower the temperature, the more effectively the soda or potash acts."

I have given Mercer's specifications almost "in extenso," because there appears to exist a

CONSIDERABLE WANT OF KNOWLEDGE

regarding the details of Mercer's work; and quite a number of observations have been put forth as novel which are clearly foreshadowed therein; e. g., the desirability of reducing the temperature when treating union cloth. Mercer further found that strong solutions of calcium chloride, stannous chloride, arsenic acid, or phosphoric acid will also induce the mercerizing effect, but are less active and more troublesome than caustic alkali.

Another interesting observation was that the addition of zinc oxide

greatly increases the action of the caustic soda, so that caustic liquor too dilute to be effective when used alone (say 20 degrees Tw.,) is rendered as active as a much stronger (40 degrees Tw.) solution when zinc oxide is added in the proportions of ZnO plus 4NaOH.

THE MERCERIZING PROCESS

in its original form has, ever since its discovery, been used to a limited extent for the production of crepon effects on cotton cloth, these being produced either by the local application of the thickened alkaline solution by means of engraved rollers, or more usually in the following manner: the cloth is printed in those portions which it is desired to protect with a thick solution of gum arabic or senegal, which acts as a resist towards the caustic soda solution. On treatment with the latter the fabric is therefore affected only in the unprotected portions, which shrink and cause the remainder of the cloth to pucker up. Many pleasing effects may be produced in this manner.

Mercer clearly recognized the adaptability of his process to the treatment of union materials composed of cotton and wool or silk, since

SUCH APPLICATION IS MENTIONED

in his patent. The process was somewhat extensively used in France about 1880 for producing crepon effects on silk-cotton material, but fell into disrepute, owing to the rotting of the silk which occurs. Within the last few years it has, however, been largely employed for similar styles in wool-cotton cloth, the process being carried out at a low temperature, as indicated by Mercer, to reduce the liability of injury to the wool.

Another application of the process, which has been in use since Mercer's time, consists in the preparation of calico printer's blankets. These are still employed, and are made by cementing together, by means of India rubber solution, two pieces of unbleached mercerized cotton cloth. These are much cheaper and better than the woolen or mackintosh blanket in use previously.

The most recent and most important application of the mercerizing process is based upon the observation that if the shrinkage of the cotton, which naturally occurs, is prevented by mechanical force, the fibre is found to have acquired a lustre which may be almost equal to that of silk, and which is of a permanent character.

THE VALUABLE PROPERTIES

imparted by the ordinary mercerizing process, viz, increased

strength and affinity for coloring matters, are also found when cotton is mercerized under tension. so that, as already mentioned, the process has practically placed a new fibre in the hands of the textile manufacturer.

It appears to be somewhat doubtful to whom the honor of discovery of this lustreing effect is due, but it is remarkable that it remained unnoticed for so long a period, and the introduction of the process is probably a direct outcome of the increased use of Mercer's original process during the last few years.

THIS NOTABLE ADVANCE

will probably not be the only result of the closer examination of the old process, since the process suitably modified is now adapted to all-wool material, to which it imparts an increasing affinity for coloring effects may be produced by a single dyeing operation.

In 1895, A. Scheurer investigated the effect of caustic soda on cotton under varying conditions of concentration, time and temperature, and entirely corroborated the earlier results published by Mercer. He found that the action is most effective in the cold, that the maximum shrinkage is brought about by using caustic soda at 50 degrees Tw., and that with this strength of liquid the action is complete after steeping for one minute.

LUSTREING COTTON.

In connection with the new process of lustreing cotton by mercerization, it will be interesting to notice the older methods which have been proposed with the object of imparting a permanent lustre to this fibre.

Much the most important of these was the production of so-called "artificial silk" which has also been termed "lustro-cellulose." In this, although the manufactured fibre is chemically identical or nearly so with cotton cellulose it entirely differs from cotton fibre in physical structure, since at one stage of the process the substance is entirely in solution. In the preparation of "artificial silk," cotton fibre is first treated with nitric acid, and thereby converted into a mixture of "cellulose tri" and "tetra nitrate." This substance

IS THEN DISSOLVED

in alcohol-ether (a mixture of alcohol and ether), forming a colorless viscous solution (collodion) which may be formed into a continuous thread in various ways. Lehner forces the solution through fine glass orinces into water, where it

solidines, while De Chardonnet dries the filament by removal of the solvent by a current of warm air.

At this stage the product contains about 11 to 12 per cent. of nitrogen, and is highly inflammable. It is therefore "denitrated" by treatment with a solution of sodium sulphide or sodium phosphate, and the fibre prepared in this manner exhibits a lustre equal to that of silk, and is not more inflammable than ordinary cotton.

The tensile strength of "artificial silk" is about 70 per cent. of that of natural silk, and the elasticity of the two fibres is about in the same proportion. It is much less costly than natural silk, but as will be evident from its process of manufacture, it is far more expensive than the lustro-cellulose produced by mercerizing under tension.

ANOTHER PROCESS

for imparting lustre is somewhat similar to an old but little used process which consisted in impregnating cotton fibre with an alkaline solution of natural silk. In the new process the fibre is impregnated with an alcoholic solution of a basic coal-tar dye mixed with collodion. The collodion acts as a mordant and thus fixes the basic color. In this manner very brilliant colors may be obtained and the cotton rendered lustrous, but the fibre does not compare favorably in this respect with the "artificial silk."

Nothing is said in the patent specification respecting the denitrating of the fibre but if this is not done it is obvious that the "lustred" cotton will be highly inflammable.

The glazing effect produced on cotton cloth or yarn by the friction and pressure of a calendar, etc., is of an entirely different character to the lustre of artificial silk or mercerized cotton. The former is due to the flattening of the surface of the threads, but the effect on the individual fibres is very slight indeed, whereas in the latter case the glossy appearance imparted to the fibre is due to the fact that each separate fibre is rendered lustrous.

LECTURE POSTPONED.

Diddereau—"Did you attend the lecture of Prof. Hardhead on 'Grip, a Malady of the Imagination'?"

Biddereau—"He did not lecture."

"Why not?"

"Down with the grip."

IMPARTING A WOOLEN APPEARANCE TO NON-WOOLEN FABRICS.

From the BOSTON JOURNAL OF COMMERCE.

Not by any means in the direction of deception or falsity is our subject going to lead us today, though on its face it might seem to have that tendency. There is a legitimate class of fabrics made from cottons and low-grade woolen stocks that are required to finish so as to have the appearance and feel of a woolen textile, and this not with any desire to deceive, but merely to add value and useful qualities to the otherwise important class of cloths. Naturally it is not a very difficult matter to so handle a cloth that is woolen at bottom as to give it woolen-like qualities; though it is sometimes difficult to make a good woolen effect out of a basis of woolen stock that is absolutely inferior. But when we come to handle a cotton fabric and try to impart the qualities of a wool, it is a different thing. Yet even this is not beyond the range of possibility, differing as these two fabrics do in nature and characteristics.

Two things are absolutely necessary in a cloth that would have the woolen effects in its finish. One is body, the other is softness or pliability. The two are almost diametrically opposed to each other, and yet their production is not out of the question. The only way to proceed in the premises is to take the cotton or inferior cloth either in stock or in manufactured state and treat it with some substance which will give a wool body or firmness to it. Once we have got the body we can then treat it so as to give the fibre the necessary naturalness and pliability. It not infrequently happens that the first substance used hardens the fabric beyond all possibility of use, unless the next part of the process is gone through with in addition. The wool quality, in fact, depends most largely upon this last part of the process, and unless it is properly carried out the first part will leave the stock in worse shape than it originally found it.

Now, suppose we have our goods ready and want to impart the added weight necessary, it is usually done by the employment of some of the starches commonly used in finishing. If it is desired to impart only a slight woolen effect which will require merely a moderate addition in weight, wheat starch is used. This will produce the firmness required in the lighter grades of goods. If the goods are quite light, and it is necessary to raise them to a considerable weight, china clay is used in conjunction with the starch. The china clay acts as a weighting material without causing any other noticeable change in the fabric. More weight and body is imparted to the cotton or inferior fabric by corn starch, next to wheat. Wheat produces the most moderate effect, corn starch next, and most of all, potato starch. The potato starch has the most marked effect of the three, and is always employed where the fabric requires a sabstantial addition of weight and body.

These starches will thus furnish the required body. It is next necessary to arrange to impart the soft and natural feel so characteristic of the wool. Fats and oils in particular manner and composition are what are employed for this part of the work. They will naturally vary as to condition and manipulation with the particular finish that is desired, and hence must be used with judgment and discretion. In addition to the softening of the surface feel of the goods which these materials bring about they also impart a sort of a lustre or brilliancy which is an invaluable item and which is almost always present in a wool of any good grade. These oils and fats exercise a two-fold function, then, where they are used for the purpose of giving the woolen appearance to a cotton or inferior fiber. The most common substances used for this purpose are animal fats, such as tallow or lard, They make a nice lustre and they give a good rich feel to the cloth. The lard must be used. if at all, in small proportions, and it must be boiled up thoroughly with the starch. If too much of it gets in, it will give a distinctively silky appearance, which is not desirable on a woolen fiber.

In addition to lard or tallow, such oils as palm oil, paraffin, and cocoanut are sometimes employed. Soap of certain kinds may be used, and even wax is sometimes found to be a desirable agent. Of all the last-named materials undoubtedly the best results are brought about by the palm oil, which has a most happy effect on

the fibres. It produces all the wool qualities except the hardness and body and may be employed freely. Cocoanut oil is good, but not so effective in its results as plam oil. You can, in fact, get pretty nearly the palm-oil effect by using the cocoanut oil, if you use enough of it. Wax, when used, gives more of the gloss than the other substances, but it errs in just this particular if not carefully employed. It will give so much of a luster that the difference is at once apparent.

The preparation and handling of the various materials employed is quite an important feature of the work. For instance, the starches that are used to lay the basis of the wool effect are boiled and applied in solution. The question is as to the exact amount of boiling required. If the goods are expected to have a perceptible and permanent solidity, the starch that is longest boiled will stand the pressing best and give the most durable results. If, on the other hand, the permanence is subordinate, and the quantity of additional weight the main thing in the finish, a less boiled starch will probably answer better. The pressure need not be quite so severe and the weight will be more largely increased.

Of course, it is well known that all these expedients fall far short of the real end in view. It is not possible to make a woolen fabric out of a cotton or different fiber, and whatever course we adopt can only lead to partly satisfactory results. But if care is exercised, and if the main principles herein laid down are carried out, the alteration in appearance will be sufficiently noticeable to bring about all that could be desired, working as we would be on such low-class stocks.

RANDOLPH.

THE VOW.

Blue eyes flashing, figure dashing,
Hair of ruddy auburn hue;
Quite the fashion, always smashing,
Can't be managed noisy Sue!

When you ask her or you task her
Why neglect she this or that.
Fast or faster than you ask her
Is she ready for a spat!

We would lend her, we would rend her
And I think she knows we would.
We would send her on a bender,
If we only, only could!

We can't woo her, we can't sue her,
And we thought her such a pearl—
But we'll do her, this gum chewer,
Saucy, lazy, servant girl!

ORMSBY A. COURT.

PIQUE CLOTH.—Continued.

By THOMAS NELSON.

The building of the harness or chain plan is as follows:

For first pick, raise 1, 2 harness.
For second pick, raise 3, 4 harness.
For third pick, raise 1, 2 harness.
For fourth pick, raise 3, 4 harness.
For fifth pick, raise 1, 2, 3, 4 harness.
For sixth pick, raise 1, 2, 3, 4 harness.
For seventh pick, raise 1, 2 harness.
For eighth pick, raise 3, 4 harness.
For ninth pick, raise 1, 2 harness.
For tenth pick, raise 3, 4 harness.
For eleventh pick, raise 1, 2, 5, 6, 7, 8 harness.
For twelfth pick, raise 3, 4, 5, 6, 7, 8 harness.

This will require twelve picks to complete one full repeat of the pattern, yet at the same time it will be noticed that only ten picks are intersected with the yarn, as on the fifth and sixth picks all the front or face harness are raised and consequently the filling that is picked through does not intersect in any manner with the threads, but is simply laid in between the backing threads and the face cloth, so that it will be readily seen that there being no intersecting if a coarser filling were put in we should have as a result a more pronounced or embossed effect as already stated. On the eleventh and twelfth picks it will also be seen how the cord or rib is formed by raising all the back threads to the surface of the face cloth which intersection and being held at a tight tension causes the furrow to be made, the harness for face cloth weaving plain all the time. If the backing threads were to be taken out a perfectly plain cloth would be the result.

When weaving these cloths a cord is generally attached from a harness lever in the dobby head to the check pawl on the take up motion so that when the wadding picks are being inserted a peg placed in chain will cause the cords to raise the check pawl and so prevent any take up. This is generally done, but will of course depend upon the weight of goods required to be made, for by raising up the check pawl heavier goods will naturally result.

Before proceeding with the particulars as to beaming when two

warps are used it is necessary to consider which of the warps the selvage threads have to be run from. In this case, as already seen, the take up of the warp for the face cloth amounts to somewhere about 20 per cent., so that it is clear a very good selvage could not be obtained from this, as it would cause them to be loose and baggy. The result then will be that the selvage threads be added to the warp for the backing threads which shrinkage only amounts to about 3 per cent, On account of this small shrinkage the selvages are apt to get tight occasionally but this is certainly the lesser of the two evils and is in general use, but undoubtedly whenever possible the best way to obtain the most perfect selvage when there is so great a difference in the amount of shrinkage is to use extra spools.

BEAMING.

The yarn having been wound from the bobbins or yarns in the spooler frame, on to the warper spools, are then placed in the creel of the warper machine. These are for the face cloth 2400 threads and as a good size of creel and one that is often used is capable of only holding 500 spools, then it is advisable to distribute the number of threads as evenly as possible, therefore the first warp could be made on a set of fine warpers beams with 480 threads on each.

For the second warp for the backing threads with 40 threads added for selvage two warpers beams with 415 threads on each and one with 410 threads could be made as the set. If an order was given for 100 pieces, 50 yards long, then for the first set of beams these would require to be 6000 yards put on the beam.

50 yards + 20 % = 60 yards.
60 yards 60 X 100 = 6000 yards.

For the second set these would require to be 5150 yards put on the beam.

50 yds. 3 % added = 51 . 5100 = 5150 yds.

The beams are then taken to the slashing room where they are put through the slashing frame, the size is added and the pieces marked the required length.

After the warp has been placed in the loom and started up, that pattern can be woven for which the chain plan has already been given. This will of course produce an ordinary pique cloth, but we can by the same warp obtain a variation of patterns by altering the chain plan. For instance, a fancy effect can be got by having the ribs set apart from each other of say about 1-4 or 3-8 of an inch, and having the back warp interweaving with the face cloth be-

tween each rib. The chain plan will be made just as in the preceding example, so as to get the rib with the wadding picks. Then for the pattern that has to be made between the ribs, for two picks the backing threads are brought to the surface of the cloth, and for the next two picks the backing threads are depressed, and the filling intersected with the face warp as in plain cloth. This can be repeated just as often as the width between the ribs is required to be, and, as will be seen, the continued locking or stitching of the backing threads with the face cloth will give a good effect, and at the same time a good, useful, and serviceable fabric will be made, especially suitable for ladies' white dress goods. When the backing threads are brought to the surface of the face cloth, the threads of the face warp will be making plain cloth. For the chain plan, make just as in previous example, but instead of continuing to make a wide rib, make the two picks as stated just so often as required.

STATE HEARING.

On Tuesday, January 31st, there was a hearing before the Education Committee at the State House, Boston, the purpose of which to act on a petition presented by the trustees of the Lowell Textile School for an appropriation of $25,000 to meet the coming demands of the school. The following men from the school were present: Joseph W. Bailey, Cotton, '99; James H. Cuttle, Wool and Worsted '99 and R. R. Sleeper, (known among the boys as "railroad" Chemistry and Dyeing, 1900. Mr. Noble and Mr. Childs represented the evening class. Several of the trustees were present and spoke to the committee, setting forth the very great necessity of such a school in this part of the country, also its many advantages, both to the manufacturers and to the students themselves.

The committee seemed very favorably impressed with the work of the students, some of which was shown them by Mr. Crosby and they decided to pay a visit to the school and so learn more of its purpose, methods of operation etc.

The students present answered several questions put to them by the chairman of the committee which pertained principally to the advantages derived from their study at the school. At the close of the hearing the students took lunch with Mr. Crosby at Young's.

JAMES H. CUTTLE.

MAKING UP HER MIND.

"Now, which would you advise, dear? You see, with the red I shan't be able to wear my magenta hat."

"Well, then, why not have gray on it?"

"Yes—yes, I think the gray will be more useful."

"It's a good material."

"Yes, and it's a pretty gray. You know what I mean, dear; not a common gray. Of course, gray is always an uninteresting color."

"It's quite."

"And then, again, what I feel about the red is that it is warm-looking. Red makes you feel warm even when you're not warm. You know what I mean, dear."

"Well, then, why not have the red? It suits you—red."

"No, do you really think so?"

"Well, then, you've got a color, I mean, of course."

"Yes, that is the drawback to red. No, I think, on the whole, the gray is safer."

"Then, you will take the gray, madam?"

"Yes, I think I'd better; don't you, dear?"

"I like it myself very much."

"And it's good wearing stuff. I shall have it trimmed with—Oh, you haven't cut it off, have you?"

"I was just about to, Madam."

"Well, don't for a moment. Just let me have another look at the red. You see, dear, it has just occurred to me—that chinchilla would look so well on the red."

"So it would, dear."

"And you see, I've got the chinchilla."

"Then have the red. Why not?"

"Well, there is the hat I'm thinking of."

"You haven't anything else you could wear with that?"

"Nothing at all, and it would go so beautifully with gray. Yes, I think I'll have the gray. It's always a safe color—gray."

"Fourteen yards, I think you said, Madam?"

"Yes, fourteen yards will be enough; because I shall mix it with—one minute. You see, dear, if I take the gray I shall have nothing to wear with my black jacket."

"Won't it go with gray?"

"Not well—not so well as with red."

"I should have the red then. You evidently fancy it yourself."

"No, personally I prefer the gray. But then one must think of everything, and—good gracious! That's surely not the right time?"—*From Jerome's "Second Thoughts of an Idle Fellow."*



LOWELL TEXTILE SCHOOL,

Evening Class of 1899—Dextile Design.

JOHN COLLIER.
Ten years with the Merrimack Woolen Company,
Dracut, Mass.
Jacquard Loom Fixer, Boott Cotton Mills,
Lowell, Mass.

ALFRED C. GAUNT,
Age 16 years,
Assistant Designer,
Tremont Worsted Company,
Methuen, Mass.

WILLIAM WILMOT,
Cloth Inspector,
Has been employed 12 years by the
United States Bunting Company,
Lowell, Mass.

ALEXANDER L. MOIR,
Clerk,
Ingrain Carpet Dept.,
Eight years with the
Lowell Manufacturing Company,
Lowell, Mass.

FRANK M. BERRY,
Clerk,
Seven years with the
United States Bunting Company,
Lowell, Mass.

E. H. SPEDDING,
Second-hand in Weaving Department,
Four years with the
Tremont and Suffolk Corporation,
Lowell, Mass.

FENWICK UMPLEBY.
Instructor.
Textile Design Department,
Lowell Textile School.
Lowell, Mass.

GEORGE H. WILTON,
Foreman of Designing Department,
Ten years at the
Stevens Mills,
North Andover, Mass.

THE LOWELL TEXTILE JOURNAL.

A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid $1.00
Single Copies 10
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the twenty-fifth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

February will go down as a record-breaker for cold and frost.

. . .

Boys, be careful, or it may be the sofa pillow that will let out the caterwaul.

. . .

There are many answers standing over, which shall receive attention at the first opportunity.

. . .

Frank A. Munsey, the New York publisher, will, it is reported, establish a hosiery mill, employing about 1,000 hands.

What next? Cats' tails! A vegetable fibre grown in swamps, is manufactured into sofa cushions and pillows.

. . .

To make a range of samples, especially double and three-ply fabrics, within twenty-four hours, is expeditious work, and shows good system and management.

. . .

This will not be the first time that a successful publisher has ventured in the textile trade. The publishers of the Utica Globe have made an attempt to manufacture shoddies.

. . .

The Lowell Textile School was visited on Wednesday, Feb. 8th, by Representative Watson of Lowell and Representative A. A. Simmons of Grafton, Worcester Co., who went into careful and detailed inquiry as to scope, aims, and equipment. Both expressed themselves as being well pleased with the school.

. . .

The methods in vogue are such that the management is always ready for and glad to receive visits from anyone interested in the work.

There are several letters that came too late for insertion this month. Correspondence should reach us not later than the 15th of each month, if it has to be published the first day of the following month.

. . .

A manufacturer was in New York, Saturday morning, and found that his line of samples did not include fancy-backed golf cloakings. He returned to the mill by the 1 o'clock P. M. train, travelling over 200 miles. The yarn was in stock, but the pattern had to be designed, the warp to be dressed, woven and finished. This was all accomplished, and good orders taken in New York City on the following Tuesday morning.

. . .

OUR PICTURE.—The third year evening design class. As will be noticed, these men are all employed in the mills of Lowell, Lawrence and vicinity. They have never been absent at roll call for two years at the evening session at the Lowell Textile School.

The photograph was taken by John Powell, Columbian Studio, South Whipple Street, Lowell, Mass. The half tone is a specially good one, bringing out the full technical excellence of the print. It is made by the Suffolk Engraving Co., Washington Street, Boston.

LADY CHURCHILL'S MAGAZINE.

The Paris correspondent of the Daily Mail says: "Lady Randolph Churchill (formerly Miss Jerome of New York) is about to start a magazine on new lines. It will be sumptuously bound, and sold at a guinea per copy. Her son, Hon. Winston Churchill, will assist her in conducting it, and the list of contributors will include Emperor William and other royal personages."

The art department of the Textile School has a fine library, containing the works of Racinet and Owen Jones, on historical ornament, also numerous other books on textile design, historical ornament, and plant form. A number of plates are mounted on cards, in a convenient form for the pupils to handle. The school is doing good work, in the direction of forming a distinctively American school of design. As all true artists say, American designing is an indiscriminate and often disastrous mingling of every style from Oriental to English.

SIMPLE LESSONS IN PHOTOGRAPHY.

OVER AND UNDER EXPOSURE.

In describing the development of a negative, it has been assumed that it has so far been a case of plain sailing with the photographic tyro. Some of the rocks or pitfalls, which usually lie in the way, may now be mentioned.

If, upon applying the developing solution, the image takes a very long time to appear, it may be concluded that either a too brief exposure has been given, or that the developer is too weak. If the former be the case, it will be signified by the high lights, such as the sky, etc., eventually acquiring vigor, the deep shadows being either exceedingly tardy in appearing, or failing to come out at all. If, on the contrary, there be no such wide distinction between the lights and shadows, but only a general disinclination of any image to appear, the presumption is that the fault lies with the developer. The remedy in this latter case is to increase the proportion of the alkali, which treatment will never fail in bringing out the details. It is not wise to add so much as to render the development too rapid. Again, it happens with many brands of gelatine dry plates that the presence of alkali in such a proportion as would effect a very quick development may "fog" or veil the shadows. This is prevented by the addition of two or three drops of a fifteen-grain solution (i. e., fifteen grains to an ounce of water) of bromide of potassium or bromide of ammonium, the function of which is to prevent any abnormal deposit on the shadows, or to keep them clean ; but, owing to the retarding influence of the bromide, it must be used sparingly. However, it permits of the employment of a larger amount of alkali than it would be safe to introduce into the developer without such a check upon its energy. It is not quite easy to say precisely how much to be added, because of the diversity in character of commercial plates, the best treatment for one brand not being necessarily that for another. There are some plates which require no bromide at all, while others are very liable to fog unless a liberal proportion is present.

Should the image make its appearance with too much rapidity all over, the shadows coming simultaneously with the lights, it may be taken as evidence of over-exposure. In this case it is necessary to act promptly, and at once to pour the developer back into the glass measure, and add to the solution a liberal dose of bromide, say, four drops, or more, according to the circumstances of the case, and, having shaken the solution so as to mix it well up, return it to the plate which, in the meantime, had been rinsed under the tap.

The object of this is to retard the action of the developer upon the shadows, which are thus held in check, while the developing action goes on in the high lights. Under this altered condition of the developer the plate may be subjected to its action for a prolonged period without danger of the shadows becoming fogged. If it is known beforehand, or very strongly suspected, that the plate has received much too long an exposure, then will it be wise to introduce two or three drops of the bromide solution along with the pyrogallic acid previous to adding any alkali at all, as this will in some measure ameliorate the effects of over-exposure, while the alkali may also have its action checked by a similar addition of bromide.

What has been said applies, of course, to pyrogallic development, and it can be readily inferred that by an intelligent adjustment of the component parts of the developer, or perhaps, more correctly speaking, of the alkali and the bromides, a considerable latitude in the exposure is permissible. In all photographic operations, development, more than any other, requires the exersise of judgment. Almost everything else can be effected by a hard-and-fast rule, but development is amenable to the intelligence of the operator, an intelligence that must be exercised in the case of every individual plate.

In fenus-oxalate development there is not the same degree of latitude as that by pyrogallic, although in cases of over exposure the latent or even partially developed image is amenable to the retarding influence of bromide, a few drops of which may, especially at the initial stage of development, be added with marked advantage. Another factor in facility of development is weakening the developer by the addition of water.

The darkening of the developer, which not infrequently becomes of a muddy-looking nature after remaining on the plate for a few minutes, may be prevented by sul-

phite of soda. One of the best ways to employ this salt is to saturate with it the water in which the pyrogallic acid is dissolved. Provided this is done, an aqueous solution of the acid may be made which will keep good for a long time; whereas, if it be dissolved in water alone, without the sulphide, it will decompose with so great a degree of rapidity as to render its preparation in this way a loss.

There are several other additions which may be made to the solution which will prevent the pyro from decomposing, but the consensus of opinion points to sulphite of soda as being the best at present known.

It will prove highly educational to the beginner if he will develope a plate without such addition, and note the state in which he finds the developer at its close, and afterwards go through the same operation with a second plate, a liberal proportion of sulphite being mixed with the developer. So clear will it remain in the latter case, compared with the muddiness of the former, that he will be tempted to use it over again on the succeeding plate, which may, in many instances, be done with advantage. F. U.

It is time to organize base ball teams.

EXPERIMENTS FOR THE CHEMICAL CLASS.

Write with acetate of cobalt or with muriate of cobalt previously purified from the iron which it generally contains, when the writing has become dry the letters will be invisible — warm the paper a little and the writing will become a beautiful blue.

Half fill a tumbler with lime water, then breathe into it frequently, at the same time stirring it with a piece of glass, the fluid which was perfectly transparent will gradually become quite white, and, if allowed to remain at rest, chalk will be deposited.

Mr. W. H. Dodge, designer for the Lowell Manufacturing Company, is an enthusiast on color. He says that few people realize how important a part color plays in our lives. The business man goes into the country to recuperate, but he does not realize how much of the restfulness is derived from the green color of grass and woods. A person inclined to be melancholy, Mr. Dodge thinks, should not go to the seashore, for the reason that the prevailing colors are of the cold blues and grays, and they have a marked effect upon a sensitive mind.

LOWELL TEXTILE JOURNAL.

CLASS ITEMS.

WM. R. MOORHOUSE, Sub Editor.

The second term of the school year, commenced Feb. 6 at the Lowell Textile School, and will end June 2, 1899.

All of the members of the class of 1901 are back with one or two exceptions.

Baseball is beginning to "bud" at the Textile school and the students predict a fast team for the coming season.

CLASS PROVERBS.

One mistake is one too many.

Don't move a house to get a stick of wood out of the cellar.

He who is in deep water must sink or swim.

Don't make two fires to cook one bird.

The best way to learn a lesson is to study it.

JEFFERSON'S TEN RULES.

Take things by the smooth handle.

Pride costs more than hunger, thrist and cold.

We seldom repent of having eaten too little.

Nothing is troublesome that we do willingly.

Never spend your money before you have earned it.

Never buy what you don't want because it is cheap.

Never trouble another for what you can do yourself.

Never put off until tomorrow what you can do today.

How much pain the evils have cost us that never have happened.

When angry, count ten before you speak.

"Charlie," "come and kiss me."

BETTER PAY FOR OPERATIVES.

At room 441, state house, before the committee on education, at 10.30 yesterday forenoon, a hearing was given on the petition of the Lowell Textile School for an additional grant of $25,000 from the treasury of the commonwealth for the purposes of the school.

Senator Parsons is chairman of the committee, Representative Leland house chairman, and Representative Judd clerk.

There were present at the hearing: A. G. Cumnock, Hon. Fred Lawton, A. S. Covel, James T. Smith, A. S. Lyon, E. S. Hylan, Thomas Walsh, of the school trustees; Senator Putnam, Representatives Hayes, Watson, Varney and Sparks, Principal Crosby of

the Textile School, with a number of the pupils, and ex-Principal Brooks.

Prior to the hearing, some printed advance sheets of consular reports, having a bearing on technical education, were circulated.

The hearing opened in behalf of the petition with remarks by A. S. Covel, treasurer of the Tremont and Suffolk Mills of Lowell and of Fall River mills. He spoke in a general way, and said that Massachusetts, being away from the base of supplies, the economic law has been averse to it. So it has been recognized that if the State is to secure the industries and keep them, such schools as the Textile School for higher education in the direction of skilled textile work should be encouraged.

Ex-Senator Lawton of Lowell said the situation had been better stated in writing, in the printed document, than he could state it. It had been the aim to epitomize the situation in that. He did not think it wise to go into the general discussion of textile schools. He simply presented the condition and needs of the schools. Mr. Covel, who represents the commonwealth in the trustees, has given you his views. He hoped that the committee could manage to come up and see the school in the daytime.

Thomas Walsh of the trustees informed the committee that he was English-born, and brought up among the textile industries of Great Britain. He entered into a review of the progress of textile industries and the textile schools established by England to retain her standing in the way of high-class manufactures and chemical products. By the same policy we shall have the fruits of these industries brought to our doors.

He gave instances of the need of skilled men from textile schools coming within his own observation. Anything that aids these industries and helps to make skilled laborers here instead of having to bring them from abroad should be encouraged in every way. Crude labor is the cheapest in the market. Intelligent labor is the highest paid. Such schools mean higher wages for skilled labor. In conclusion, he gave some practical illustrations of the value of skilled labor, and knowledge of mechanics and chemicals. The future of the pupils did not trouble him. Having given them the instruction and opportunity, we can leave them to the great battle of life.

In answer to questions, Mr. Walsh said the money asked for is needed to extend the chemical department of the school. The

English schools, he said, receive government aid. Our School of Technology only teaches technical chemistry. For practical purposes the Textile School has to re-educate such pupils.

Principal Crosby of the Textile School exhibited samples of the actual work of the pupils, weaving, dyeing, etc. Some of the chemical samples were coal tar products. He also showed what had been done from the raw product. Some sheets showing the work of the pupils in designs, he also exhibited. That feature, he said, is one of the most prominent in the school. Samples of woven stock were also shown.

Several pupils of the school, Messrs. Cuttle, Bailey and others, who had no practical knowledge on entering, were introduced. They are now filling important positions, one of them in the Arlington Mills.

Mr. Childs, an assistant at the Hamilton Mills, gave testimony of the valuable instruction he had received in the evening classes in the school, especially designing.

Mr. Noble of the United States Bunting Company, Mr. Sleeper and Representative Varney gave valuable testimony of the practical benefits derived from the school and its work. They spoke from personal experience.

E. S. Hylan, from the standpoint of a worsted manufacturer, told of the benefits of the school and looked to see the worsted industry one of the most prominent in the future of the country.

Treasurer A. G. Cumnock of the Appleton Mills, president of the school trustees, set forth the school and noted that there is $181,000 worth of machinery. Also that all the machinery and charts from abroad had been admitted by the government free of duty. The school is well equipped and only lacks in two departments named. The school has become a child of the state and the state cannot afford to give it up. Give us the means and you will be proud of the school in the future.

Senator Putnam had said that he didn't think the state should ask for private support for the schools. He thought the state appropriation should be unquestioned.

After remarks by ex-Senator Lawton, Representative Hayes said the chairman of the trustees was rather in favor of state support. But the school can show the results of what has been given. Isn't the money of the state well spent? He would favor spending $100,000. You have men before you who represent the largest corporations in the state. They are interested in securing and keeping skilled labor in this country.

Mr. Cumnock hoped the appropriation would not be cut down and thus cripple the school.

The committee were evidently much interested in the information afforded and the hearing closed about 12.15 o'clock.

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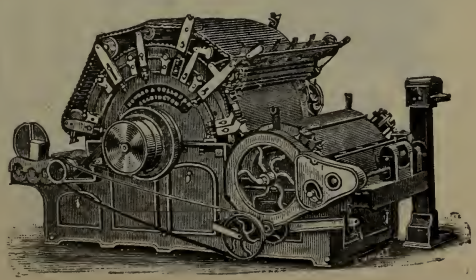
HINTS FOR GRADUATES.

Timely Suggestions for the Girl Who is Puzzled Over Her Thesis.

The day of reckoning has come for the Senior girl of college and high school. Examinations have some terrors to the young woman who has neglected her studies, but to the average, well-regulated girl who has done her daily duty faithfully throughout her course, the bugbear of her present college work is the choice of a subject for her graduating essay, says the Pittsburg Dispatch. The last day of actual college life when in the heart of every graduate there burns the desire to do honor to alma mater and send gratification to the hearts of her fond parents, not to mention the wish to reflect credit upon one's self—this is the day to which few alumnae can look back with the pride of a successful college career crowned with the triumph of a brilliant thesis well delivered.

There is always something which interferes to prevent the full realization of the Freshman's dream of laurel-crowned glory at the end of the college race, and as a result the feelings of the average graduate on the subject of her commencement thesis and its delivery

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are tinged with regret, which increases with years, and sets her to wishing a hundred times over that she might go back and do it over again.

The chief reason for this failure to satisfy one's self in the execution of the crowning effort in college life is the lack of a good subject. The Senior girl postpones her decision on a given topic as long as possible, in the hope that a better one may occur to her. This is wise enough, but leads to the final dilemma of taking any subject at the last moment when the faculty demand a decision and a notification of what the topic is to be.

Here is a topic which combines the idea of "woman's rights" with historical facts: "What has woman done to prove that she is capable of governing her fellow men?"

This is a question which admits of argument on both sides, and one may have recourse to the histories of many races for examples of each.

Another manner of putting the topic is this: "Is woman more powerful as an actual ruler or as an influence behind the throne?"

An enterprising girl who thinks of making journalism her means of livelihood would find a symposium of some sort of a valuable preparation for future work. If properly done there would probably be no objection on the part of the



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faculty to this form of graduating essay, and the long-suffering audience assembled to listen would find it an agreeable variation from the usual essay on Elizabethan poetry, or abstruse scientific subjects which the average graduate is rarely fitted to discuss.

For the young woman of legal propensities a good subject would be a comparison of woman's legal status with what it was 50 years ago. For information on this topic I should recommend the name of Mrs. Alice Stone Blackwell, of the Woman's Journal, Boston, as likely to be useful. Her name is so near Blackstone that it must have inspired her to compile legal statistics and facts in her capatious brain —at any rate, there are few things which concern woman from a legal standpoint with which she is not familiar.

"Woman's Place in War" is a timely topic upon which modern histories and the daily papers give abundant information, and there is plenty of room for the expression of personal opinion and argument.

Finally, as a piece of general advice, avoid historical subjects which do not bear upon a topic of present interest and merely involve a compilation of facts without proving anything. It is impossible to be original with such a subject. The most that can be done is to rehash in different language the facts of recorded history.

To remove peach stains from white table napkins without injuring the fabric, try Javelle water or weak solution of oxalic acid. Wash out thoroughly. It is well to follow Javelle water with a weak solution of sulphurous acid.

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HINTS FOR BOYS.

A gentleman advertised for a boy to assist him in his office, and nearly fifty applicants presented themselves before him. Out of the whole number he selected one, and dismissed the rest. "On what ground did you select that boy without a single recommendation?" "You are mistaken," said the gentleman, "he has a great many. He wiped his feet when he came in, and closed the door after him, showing that he was careful; gave up his seat to that lame old man showing that he was kind and thoughtful; he took off his cap when he came in, answered my questions promptly and respectfully, showing that he was polite and gentlemanly; he picked up a book, which I had purposely laid upon the floor, and replaced it on the table, while all the rest stepped over it or shoved it aside; and he waited quietly for his turn, instead of pushing or crowding, showing that he was honest and orderly. When I talked with him I noticed that his clothes were carefully brushed, his hair in nice order, and his teeth as white as milk; and when he wrote his name I noticed that his finger nails were clean, instead of being tipped with jet like that handsome little fellow's in the blue jacket. Don't



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J. POWELL

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THE LOWELL TEXTILE JOURNAL

W. I. HERVEY, D. D. S,

Crown and Bridge Work

DENTAL ROOMS,

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LOWELL, MASS.

you call these things letters of recommendation? I do, and I would give more for what I can tell about a boy by using my eyes ten minutes than all the letters of recommendation he can give.

THE SMALLEST CIRCULATION.

There is a little magazine published in England which never circulates outside the members of a single family. It is called the Dart, and is issued by Mr. J. D. Lamb, Inderwick Road, Hornsey. The Dart is the means of monthly commnnication between the members of a family. There are about thirty copies published each month, and they contain sketches, poems, reviews, and other original matter, all contributed by members of the family. It has been in existence fifteen years.

THE MAN WHO NEVER SLEPT.

Millionaire Bain, president of the Bain Wagon Company, whose death is announced from Pasadena, Cal., was familiarly known as the "man who never slept." It is virtually a fact that for the last sixteen years he hardly slept an hour in his bed. Over-devotion to business was the cause of his sleeplessness. For the past ten years it was his custom to take daily trips to Chicago, riding and driving during the day, while at night he was always to be found either at a theatre or billiard hall, which were the only places where he was able to get a short nap.—New York Journal.

Hot water cannot be raised to any considerable height by suction.

OTIS ALLEN & SON,

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ALLEN'S STANDARD LOCK-CORNERED FILLING BOXES,

Generally used in the New England Mills.

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Do you know that Legault & Co. can repair your watch and jewelry in the best possible manner.
CALL AND SEE THEM

ROUGH ON THE TOE.

A lady grievously tormented with a corn on one of her toes, was advised by a friend to anoint it with phosphorous, which in a weak moment she did, but forgot to tell her husband before retiring at night.

It had just struck twelve when the husband awoke and was startled to see something sparkle at the foot of the bed. He had never heard of a fire-fly in the locality, nor did he ever remember seeing such an horrible looking object as the toe presented.

Reaching carefully out of his bed till he found his slipper, he raised it high in the air and brought it down with terrible force upon the mysterious light. A shriek and an avalanche of bed-clothes and all was over. When at last he released himself from the avalanche, he discovered his wife groaning in the corner. He had struck the phosphorated toe. —*The Household.*

JANUARY ANTICIPATIONS.

Most of the historic frosts either began or continued in January; that of 1205, chronicled by Stow, when frozen ale and wine were sold by weight, began on January 14, and lasted till March 20.

Gus—What are the holes for in the mule head?

Aleck—Oh, just to put the pins in. So that you can give the baste more twist, and put on the screw to make him keep his end up.

E. W. YOUNG,
7, 8 and 9 Hildreth Building,
Has a complete establishment for Hair Dressing, Massage, Manicuring and Chiropody.
Prices very low for work of highest order.

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And all Forms of Mill Receptacles.

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L. D. Telephone, Arlington, 44.

THE CYCLIST CZAR.

Perhaps the most salient features in the character of the Czar is his aversion to the needless slaughter of animals of any kind. He has recently forsworn the pleasures of the chase and the shooting of game, and since his suite, from motives of policy at any rate, refrain from indulging in this pastime, the beasts and birds in the Imperial demes nes live in undisturbed quiet. For exercise the Czar is accustomed to take a spin on a bicycle, and just now he is often to be seen in the morning, dressed like a tourist, peddling merrily along the roads about Livadia. He enjoys a good game of tennis and pulls a fair oar.—"Daily Mail."

THE SCHOLAR.

My days among the dead are past;
Around me I behold,
Where'er these casual eyes are cast,
The mighty minds of old;
My never failing friends are they,
With whom I converse day by day.

With them I take delight in weal
And seek relief in woe;
And while I understand and feel
How much to them I owe,
My cheeks have often been bedewed
With tears of thoughtful gratitude.

My thoughts are with the dead; with them
I live in long—past years—
Their virtues live, their faults condemn,
Partake their hopes and fears,
And from their lessons seek and find
Instruction with a humble mind.

My hopes are with the dead; anon
My place with them will be
And I with them shall travel on
Through all futurity,
Yet leaving here a name, I trust,
That will not perish in the dust.

ROBERT SOUTHEY.

C. G. SARGENT'S SONS,

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HATS ····

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A CHICAGO PROPHECY

England will fight for no trivial cause. When she strikes it will be a blow that will change the map of Europe, and millions of treasure will go to the bottom of the sea. The empire has become so vast and the possible complications with other powers so great that war becomes a matter of business-like calculation, involving the interests of civilization as well as of commerce. When the British lion grapples with the Russian bear in the contest for commercial supremacy in China, it will be after all the arts of diplomacy have failed to bring about an understanding with reference to spheres of influence. And when the clash of arms comes the Cossack must give way to the invincible Anglo-Saxon, and the domination of the Orient by the English speaking races will be complete.—Chicago Times-Herald.

WHAT ORGAN FIRST RELAPSES INTO SLUMBER.

It is said by scientists to be a fact that all our senses do not slumber simultaneously, but that they fall into a happy state of insensibility one after another. The eyelids take the lead and obscure sight, the sense of taste is the next to lose its susceptibility, then follow smelling, hearing, and touch; the last named being the lighest sleeper and most easily aroused.

It is curious that, although the sense of smell is one oi the first to slumber, it is the last to awake. Hearing, after touch, soonest regains consciousness. Certain muscles and parts of the body begin to sleep before others. Commencing with the feet, the slumberous influence works its way gradually upward to the center of nervous action. This will explain the necessity of having the feet comfortably warm before sound sleep is possible.

Lowell Textile Journal

TEXTILE AND TECHNICAL EDUCATION.

Before entering upon the general consideration of our subject, it is necessary that the real meaning of the words, "technical education" should be in some degree made clear. These two terms have been so bandied about, so misapplied, and so misunderstood, that many who really stand in need of such a course of training are now asking, What is technical education and what is a Textile education?

Technical instruction may be briefly defined as the application of the great principles of science to the various branches of industry; it gives, in fact a knowledge of practical science and art adapted to the required purposes, and to the conditions imposed by the nature of the materials employed; and it teaches the principles upon which the processes of working are based, of what nature soever the occupation of the worker may be.

It will be seen then, that technical instruction cannot be taken as a distinct and separate branch; it must grow out of, and depend entirely upon a sound elementary education, and a knowledge of the fundamental principles of science. To attempt technical instruction, therefore, without this basis is as absurd as to attempt to guide a steam railroad train without previously laying the railroad bed and tracks.

Taking up the subject of textile education, which can be defined as meaning a Technical education so far as regards Textiles. The word Textile is described as pertaining to a woven fabric, or that may be woven. The subject has had very little attention until recently in this country, and after all these years of neglect, we must do the best we can with our artisans whose time has been taken up in the mills, consequently their elementary education is deficient and whose time for study is necessarily very limited.

The work requires therefore, the earnest exertions of men as in

structors who must be thoroughly practical and competent workmen in each department, who can teach the elementary principles of the science and art, and also show their practical application in the simplest manner, it requires the greatest tact on the part of our lecturers and teachers in popularising and simplifying those studies which have become to be regarded as abstruce and difficult, and which are consequently approached with fear and dread.

Those students require cheering and encouraging by the way; they require that the obstacles and roughness which obstruct their path shall be removed or smoothened down. They truly want words to guide and hands to lead.

As regards our young people male and female, admitting the early age at which they are generally taken from school, a primary education is now within the reach of all, and the educational system is being improved, so as to become the basis for a higher system, to be carried out in the science classes which are spreading all over the country. It is with confidence that I would encourage workingmen and others to take up the various branches of study in the several departments of a Technical School, and in the hope of inducing them to give the children a sound primary education, which is the best foundation for a technical course.

All who are sensible to the superiority of a superintendent who has a thorough knowledge of all the details in connection with his trade, must feel grateful that there are institutions where they can send their sons to get such instructions as shall enable them to compete with the most skilled of workmen. A Technical education to be ultimately useful, must from the very beginning be of a defined character, reading, writing, and arithmetic must be mastered and every lesson must be a part and parcel of a course to be subsequently carried further, even as every brick, however low may be its situation in a wall, supports others in the superstructure. For a moment, let us compare the late system of apprenticeship.

As a boy he attends a Normal School where he may be and in most cases is, well taught by a man who is earnest, energetic, self-sacrificing and conscientious, but the course of study is simply to be the three "R's, the master is not conservant with higher studies, and in many cases he is not competent to give a technical tendency to his teaching, his own education having been merely literary in character, in fact unacquainted

with the commonest principles of design, construction and mechanism, although he may have read the science of mechanics. Their own education having been purely theoretical, and as young men are appointed in the schools in different parts of the country, they are in most cases unacquainted with the industries and the processes carried on in the industries of the locality, whilst the elementary principles upon which those are founded, should certainly form branches of study in the school, so the student does not acquire a knowledge of the sources or qualities of raw materials in which they may subsequently have to work. The natural and unavoidable consequences of such a state of things is that, excepting in some of the industrial and manual schools where gardening, shoemaking, tailoring, carpentering are carried on as occupations, not as studies, but merely classed with wood chopping. The boy leaves the school without having received any notions of what may be called the theory of work, or of the sciences upon which the practical arts are based, thinking of chemistry as a mysterious art by which the druggist compounds medicines and naturally associating physics therewith. He looks upon a locomotive as a machine which somehow or other pulls the cars along, and building is to his mind merely the work of the bricklayer, and carpenter.

Let us follow the boy, and see him placed in an engineer's or railway works. He is at the commencement merely an errand or chore boy, being fit in fact for little else.

He is subsequently posted in one of the departments, his instructor being the man under whom he works; but this man having his own work to attend to, has not time to teach, and even were it not so, he could only show the boy the manual operations. It is but rarely that a boy placed in such a position will have been able to acquire any of the scientific principles of his trade.

Some brilliant exceptions there are, of course, but this is the general rule.

When the piece of work on which the apprentice has been engaged is finished, it has to pass the foreman of the department, generally a man who, through honesty, sobriety and manipulative skill, has risen from the ranks of the workmen, and whose education has been of a character similar to those around him. The foreman's duties leave him no time, even if he were competent to give instructions, and thus the boy goes along. In time

he comes of age, and becomes a journeyman, he may become a foreman to govern others; thus the rule of thumb, each man working as his shopmates do, proceeds, and thus has ignorance of principles been carried on from one generation to another.

On entering the office of an architect or civil engineer, the youth has to attend to various office duties, to make tracings and so on, and get a knowledge of his profession in the best way he can, for it must be remembered that in a place where all are engaged in their business, it is not any one's special duty to teach him, so that the embryo architect, like the young artisan, grows up to repeat what has been done by others, not daring to invent, being by very virtue of his education wholly deficient of the materials necessary for invention, and of the scientific principles which should guide him in designing.

Happily these remarks do not apply to all our schools at the present day. The evening classes of science and art have been established and are doing a great and useful work in offering to young people sound instruction by competent and properly certified teachers.

At the present time we have our Kindergarten, even learning our babies to tell the difference between Form and Color, Light and Shade. Then there are the trade or manual schools where the student can learn the use of tools for leather work, carpentering and cabinet making and so on. These form a part of the work of the primary schools for all classes, and the science schools should take up the studies at a higher stage, when the student, more advanced in years, and with intellect improved by previous training, feeling in their daily vocations the use of the elementary education they have received and the necessity for extended knowledge, enter into the lessons with earnestness and appreciation, whereas, to adults totally uninitiated, the necessary steps of the road to learning, however much tact and power of a clever teacher may enable him to smoothen it, is still irksome in some cases, causing many to droop by the way and get discouraged, and to discontinue their attendance.

School teacher, examining class lights on the youngest, and was so struck with his intelligent aspect that he questions him forthwith—"Now, my little man, what do five and two make?" The little one remained silent. "Well, suppose now: I were to give you five rabbits today and two tomorrow, how many rabbits would you possess?" "Eight," replied the juvenile, promptly. "Eight! Why? How do you make that out? "Cause I've got one at home already."

REVOLUTION IN TAPE WEAVING.

THE POYSER LOOM.

Professor Roberts Beaumont delivered a lecture in the Textile Lecture Hall of the Yorkshire College on Thursday night, on "The Poyser tape loom: A revo-volutionary invention in power-loom weaving." The lecturer opened by observing that they were highly favored, inasmuch as the inventor of the Poyser loom had permitted them to have his loom on exhibition, and had acted in a way which they did not always find inventors prepared to do. He was wishful they should understand the loom he had invented in all its details and to see for themthemselves what it would actually accomplish. The Professor then took his audience back to the time —less than a century ago—when the click of the hand-loom was to be heard in the household, and spoke of its gradual annihilation by the power loom. Speaking of the main difficulties experienced in power-loom weaving, such as the production of a variety of weave design, weft coloring, and shuttling, he said these, the Poyser loom, did not obviate. The Poyser loom only wove stuff an inch wide, such as braids, tape, ribbon, etc., so that in that sense it could not be called of a revolutionary character. Reverting again to the power loom, the lecturer asserted that in all power looms there had been no new departure from the original mechanical invention of the second loom of Cartwright. There had been a perfecting of the idea rather than the invention of a new principle. Professor Beaumont proceeded with the aid of diagrams to compare the intricacies of the ordinary looms with the mechanism of Mr. Poyser's invention. In the shedding and picking up of the welt, and the insertion of the picks of welt, which were the three leading principles in weaving, they had in the Poyser loom no new principle but the old one perfected and extended. After further illustrations and explanation of the working of different parts of the new invention, such as the putting of the shuttle behind the batten, and the substitution of

the shaft by a balanced wheel and grooved drum, and a comparision with the corresponding parts of the power loom, Professor Beaumont said the merit of an invention was determined by its simplicity, its productive capacity, and its efficiency. The Poyser loom in the weaving of narrow fabrics was destined to supersede the old form of loom. It was easier to manipulate, and the small space which it occupied was greatly in its favor. The old loom was nine feet high, whilst the height of the new loom was two feet nine inches The breadth of the old loom from the back to the front was four and a half to five feet, whereas Mr. Poyer's invention was only 14 inches. On the ground of simplification the new loom had succeeded. In respect of productive power Professor Beaumont showed that whereas the old loom had not more than 140 to 160 picks per minute, the Poyser loom could be run without any undue strain upon the warp to 500 picks, and he had seen it working at over 1,000 picks per minute. Another point in its favor was if one of the many threads broke they could repair it without stopping the other parts of the loom. The efficiency of the loom, said the lecturer, would be proved by the nature of the fabric. The mechanism of the loom indicated a combination of parts working in unison, with a view of obtaining the maximum amount of material with the minimum detail. In conclusion the lecturer said it was gratifying to find that, as in the past, while we had taken the lead over other countries in the origination and perfecting of carding, spinning, weaving, and finishing machinery, a loom which might be an epoch-making one in the textile world had been invented by a fellow-countryman.

TEXTILES MADE OUT OF PEAT.

At first blush this looks ridiculous; nevertheless, it is a fact. Peat from Irish bogs is being converted into textile fabrics. "The Drapers' Record" publishes this rhapsody:

Come, publish the tidings! Shout voices Imperia!,
In the ears of a nation for good news agog,
For ye haven't to go far to git yez material
Whin cloth can be made out of good Oirsh bog.

From the fruit of the tree they make cotton and calico,
From sheep they make flannel, and shocks for yer feet,
And ye thread on the tail of poshterity's paletot
Whin ye walk a few shteps on the foine shpringy peat.

So hearken ye, Pathrick, don't lave yer own shore,
For ut's "back to the land" wid yer mither and lass,
For sure now Ould Oireland shud prosper once more,
Wid a possible cloth mine in ivery morass.

SIMPLE LESSONS IN PHOTOGRAPHY.

CLEARING, REDUCTION, AND INTENSIFICATION.

It frequently happens, especially in pyro development, that a yellow veil covers the completed picture. This may be removed by soaking the negative in water acidified by hydrochloric acid, or preferably in a solution consisting of—

Alum . . . 2 ounces.
Citric acid . 1 ounce.
Water . . 10 ounces.

but in both cases the negative should be well washed both before and after clearing.

In addition to the staining of the picture, there are two other defects which often characterize the finished negative, and which, if the latter is to possess any value for printing purposes, it is essential should be remedied. The first of these is a too great density of image, arising mainly from a faulty system of development, whereby a degree of opacity has been obtained which operates to prevent the light penetrating those portions of the negative that supply the shadows, half-tones, and details of the positive prints. The character of a print yielded by such a negative partakes also largely of chalkiness and harshness of contrast, and hence it is desirable that the density or thickness of the negative should be reduced, in order that a negative of good or fair printing quality may be produced.

Probably the simplest, and at the same time the most efficacious, plan consists of treating the negative with a solution of iron perchloride, and then submitting it to the action of the hyposulphite fixing bath, which removes those portions of the image converted into chloride of silver by the perchloride.

Make up a solution consisting of—

Perchloride of iron, 1 drachm,
Water 4 ounces,

and immerse the negative therein until it is bleached or whitened. Next wash it well, and pass it into the fixing bath, when the desired reduction will take place. If the density of the negative does not prove to have been sufficently reduced, the operation may be repeated; but it is desirable to pro-

ceed with extreme caution, otherwise an opposite effect to that sought for may be had. The other defect alluded to, is a thinness of image which renders the negative so translucent as totally to destroy its utility for printing purposes, inasmuch as those parts which should be black and comparatively opaque allow the light to penetrate too freely, thus producing flat, heavy prints, utterly devoid of contrast between the lights and shadows. In this case it becomes necessary to intensify the negative—that is, so to add to the density of the image as to strengthen it for printing purposes.

This may be done by treating the negative with a solution of bichloride of mercury, which bleaches it, and afterwards immersing it in the fixing bath.

Make the following solution:—

Bichloride of mercury . 40 grains.
Chloride of ammonium . 40 "
Water 2 ounces.

The negative, previously well washed and perfectly free from hyposulphite, is placed in the solution until the picture turns greyish white. It is again thoroughly washed, and plunged in the hypo fixing bath, which rapidly 'blackens' it. The hypo, instead of dissolving the bleached image, as in the reducing process with chloride of iron, now performs a different function, inasmuch as it leaves the intensifying agent practically intact upon the picture, which is thus increased, instead of decreased in density.

Although this is perhaps the simplest plan of intensifying a gelatine negative, it is right at this stage to warn the student that it is a little uncertain in the character of its results. The conditions of success are that before intensification the negative be absolutely free from developing stains and hypo, and that between each of the operations a most thorough washing be given.

There are many other intensification processes, not perhaps open to this reproach, which, however, would be out of place in these elementary articles. Mercurial intensification, nevertheless, affords an instructive illustration of the principles involved, and, besides serving an introduction to other systems, will also, if the conditions as herein laid down be scrupulously observed, yield results of a satisfactory kind.

Flanged pulleys destroy many good belts. A properly rounded pulley will retain the belt on the center. A belt ought only to have contact with the pulley face.

PREPARING WATER-PROOF CLOTH.

These methods may be divided into two groups. In some, a precipitate of salts of the fatty acids is produced upon the tissue itself; in others, the cloth is saturated with melted or dissolved substances, which, when they are once solidified on the fibre, have the property of repelling water. If any of the former class of methods is selected, the cloth is passed into a special machine, in which it is saturated with aluminum acetate; it is dried and passed into a soap bath. It is necessary in this operation to produce a basic compound. For this purpose, there are employed equal weights of salts of aluminum and of lead. Care must be taken not to introduce too large quantities of free acid with the aluminum sulphate, since the latter contains always a certain quantity of sulphuric acid, which, during desiccation, displaces the acetic acid. To avoid this inconvenience, there are added per liter from 10 to 80 grms. of soda. The most favorable temperature is 50 deg. Heating by direct steam must be avoided. For preparing the soap bath the author utilizes the fact that an aqueous solution of soap forms true solutions with mixtures of fat and wax, resins, mineral oils, and even caoutchouc. To this end he takes a ten per cent. solution of gum Paraguay in oil of turpentine. The proportions to be employed for a square meter of cloth are 30 grms. tallow soap, 25 Japan wax, 1·5 gum Paraguay, 1 grm. good varnish. The wax is first melted, the gum and the varnish are added, and then for each kilo. of the solid gum there are added 0·5 grm. of a solution, saturated in heat, of potassium sulphide (liver of sulphur). The mixture is stirred and boiled, when sulphureted hydrogen is liberated. A boiling solution of soap is added, when the bath is fit for use.—*Em. Doring, in Romen's Journal.*

OUR NEIGHBOR.

He hammered and battered and rattled,
He sputtered, he roared and he swore,
For the lord of the Manor was trying
To hang an old home-made screen door.

At first he was smiling and careless,
He acted as if it was fun,
That it only required a moment,
And then, why and then it was done.

The moments were fast multiplying,
Like the moisture that steamed from his brow,
For the fun was assuming proportions,
He never had dreamt of till now.

He turned and he twisted and struggled,
He reached and he lifted and blessed,
But each time that he tried to lock hinges
It semed like a creature possessed.

At last it was placed in position,
And he gleefully opened it wide,
When crack went the old rusty hinges,
And the door to the woodpile was hied.

ORMSBY A. COURT.

THE KEELY MOTOR UNVEILED: A GIGANTIC FRAUD.

The papers give long and interesting accounts of the discovery of the secret of the late Mr. John W. Keely, the reputed inventor of a motor worked by "a new force in nature," which he claimed to have discovered. This motor was to revolutionize mechanics, and to run indefinitely without the aid of steam, electricity, air or gas. He induced many people to believe in his scheme, and a company was formed, the shareholders of which supplied him freely with dollars for the developments of the motor.

Mr. Keely lived in a luxurious house in Oxford street, Philadelphia. In his laboratory on North Twentieth Street were the mysterious motor and what he called the lever machine. It lifted enormous weights, and Mr. Keely said the force was "vaporic tension," that it was conveyed by wires, and was purely vibratory. His motor he called sometimes a rotary etheric engine, sometimes a harmonic engine. The power that moved it, to quote his own words, was obtained from "inter-atomic air, or rather, luminiferous ether." He claimed that he had this power under complete control; that it was greater in force by five or six times than gunpowder, and that he could so increase the power, "by multiplied concentration," that in eight seconds he could produce a pressure of twenty-eight thousand pounds to the square inch. The motor itself was quite a ponderous affair; the bed plate was 12 by 6 feet; the weight, 4000 lb.; insular disk, 600 lb.; pulley standards, each 3200 lb.; ten vibratory tubes, 150 lb. each; resonating box, 150 lb.; steel shaft, 9 in. in diameter, 1500 lb.; 66 in. shell, 10,025 lb; another shaft, 9 in. in diameter, 1107 lb. The total weight of the affair was about 25,000 lb., and it looked like a collection of soda-water retorts. The force that started this engine and kept it going, Mr. Keely claimed, was the etheric force he had discovered.

Whenever Mr. Keeley exhibited his motor at work, which he would only do at twenty-four hours' notice, he poured about half a glass of water into a glass stand pipe connected with one of the retorts. Then he struck various parts of

the machine with a violin-bow, and this was followed by the tightening and loosening of bolts and screws. Then the machine began to operate, and the beholders marvelled. He was in the habit of humming snatches of songs or twanging a violin-bow, or playing a harmonica, when giving exhibitions of the lever or the motor. His claim was that music exercised a potent influence in the release of the etheric force which he had discovered.

Since Mr. Keely died his laboratory has been leased by Mr. Clarence B. Moore, whose mother was one of the most liberal subsidizers of the Keely motor. With his concurrence the laboratory has been ransacked by a party of scientific investigators commissioned by the Philadelphia Press, who affirm that the agency Keely used in the performance of his bewildering experiments was nothing more or less than compressed air. The investigators were Professor Carl Hering, a consulting electrical engineer of wide experience; Professor Arthur W. Goodspeed, Assistant Professor of Physics in the University of Pennsylvania; Professor Lightner Wismer, Professor of Psychology at the University of Pennsylvania, who undertook the inquiry as a study of delusions; and Dr. N. G. Miller, who had special training in exploration and research in the way of mound-digging, and accordingly superintended all the digging operations in Keely's laboratory.

The investigation was conducted at some disadvantage, because members of the Keely Motor Company had been there before them, and had removed the experimental machinery; but they found hidden away in the floors and the walls of the laboratory quantities of fine, strong brass tubing, similar in appearance to parts of the motor that Keely insisted were solid wire, which transmitted his vibratory force. These tubes were so disposed as to indicate that they were used for transmission of power to the apparatus which Keely exhibited from time to time, doing work which was marvellous according to his explanation, but commonplace if the result of compressed air. Beneath the lower chamber of the building has been dug out a great iron or steel sphere, strong enough to resist great pressure, and with fittings which suggest that it was a receptacle for compressed air. Tubes ran from the neighborhood of this sphere in the direction of the exhibition-room.

These discoveries are referred to by the "New York Herald" as confirming the contentions of one

of its own scientific correspondents in 1891, that compressed air was the secret of the motor. Professor Hering has said to the "Herald's" Philadelphia correspondent: "I had often wondered whether Keely was a fool or a knave, by which I mean whether he was ignorant of the well-established laws of nature, and was therefore groping in the dark, or whether he practised deception in order to get money from his supporters. I am now satisfied that he was both a fool and a knave." Professor Goodspeed said: "It is needless to call attention to the fact that the finding of the steel sphere, together with many fine tubes, points strongly in favor of the compressed air theory." Clarence B. Moore, the son of the late Mrs. Bloomfield-Moore, said: "I went up there reluctantly, since my known bias against Keely and his motor would make his supporters distrust any finds I might make. The result of the investigation, to my mind, confirms beyond a shadow of a doubt the conviction I arrived at years ago that the thing was a fraud."—"*Daily News.*"

Recently at the Occidental Mill one-half of a log was sawed, which was 10 feet 3 inches in diameter. It was worked up into 3,900 feet of lumber. While this is not a remarkable thing in redwood logs, still a whole log that yields 7,800 feet of lumber is deserving of honorable mention.—*Eureka (Cal.) Standard.*

CURIOSITIES OF THE CALENDAR.

The following little curiosities of the Gregorian calendar are recalled by the "Westminister Gazette":—Since the calendar was reformed by Pope Gregory no century has ever begun on a Wednesday, a Friday, or a Sunday; and the same order of days is repeated every twenty years. January and October of each year always begin with the same day; so with April and July; so with September and December; so with February, March and November. Strangely enough, there is no single day of the week which is not accepted by some portion of the human race as the "day of rest." For example:—Christians, Sunday; Greeks, Monday; Persians, Tuesday; Assyrians, Wednesday; Egyptians, Thursday; Turks, Friday; Jews, Saturday. As measured by the unerring sun, the errors in the Gregorian calendar amount to one day in every 4000 years.

A LADY AND HER MATINEE HAT.

The matinee hat has been a source of trouble in Athens, as in London and Paris. Such was the annoyance caused by it that the new Minister of the Interior, M. Triantaphyllacos, found it necessary to adopt stringent measures. Accordingly he issued an order against hats at theatrical performances. All the Greek journals, without distinction of party, supported his action. In spite of this the ladies protested. The new rule has resulted in several comical scenes. Here is an account of one which the "Gaulois" reproduced. The other day a lady, elegantly attired, arrived at the theatre. She wore a small hat, but an official politely recalled to her mind the new Ministerial rule. The lady drew attention to the smallness of her headgear; but the official was inflexible; she had to remove it. The lady protested, and in a loud voice vowed that she would be revenged. She arrived at the theatre on the following day with no hat at all. But her hair, which was luxuriant, was done up in such a way as to form a veritable monument. The official could not help himself, and those seated behind the lady were heard to express their preference for a small hat and no hair.

Every girl knows how frequently ostrich feathers require recurling, and what expensive items they eventually prove, if the operation has to be carried out by a cleaner. Now the curling can be done perfectly at home with little care and patience. Get a narrow sharp ivory, silver, or wooden paper-knife—never use anything with a keener edge, or it scrapes the fluff off the strands of the feather—take the extreme tip of the plume, and with your thumb on the top, scrape the knife hard along the under part of the rib, so as to curl it, then curl the undermost strands on the left side, taking them in bunches of four or five at a time. Do not curl them very tightly, but make them curl over roundly from the center rib of the plume. When you have done this to both sides, take the upper strands that are left, three or four from each side together at a time, and curl them so as to cover the rib all the way. Then shake your feather in front of a hot fire, when you find many strands standing up straight here and there. These require individual curling and the whole should be arranged to look full and compact.

MADGE.

See particulars about voting contest on page 32.

Some old chestnuts and a few more stories added to the piquancy of the post-prandial proceedings of the Tradesmen's Association annual dinner. Mr. J. Walker Clarke set the ball a-rolling about a widower who had the temerity to marry again, whose second wife presented him with an olive branch. Johnnie, of the first family, was called in to see the bundle of pink and white. After suspiciously eyeing the intruder Johnnie said to his father, "Ah, father, they've done you; he's got no hair and no teeth—it's an old un." This was followed by Mr. Walter Bagshaw who, enforcing the lesson of loyalty to a town, cited the case of the boy who, when told that "they have bought a new baby," exclaimed, "Dad will be mad if they haven't got it at the Co-op." Yet a third story which was not retailed with the "walnuts and wine." This emanates from and is said to have occurred during the blanket industry depression. James, asked by a gentleman how many there were to the family, replied, "Two besides me; but there would have been more if trade had not been so bad."

Among the old Romans, the year, in the earliest times, began in March, and it was the second King of Rome who altered it to the 1st of January, Janus, the God of the month, had two faces, one looking back over the year just closed, one looking forward into the future. It is only in comparatively recent times that an agreement has been arrived at, as to when the New Year commences. The Gregorian reformation of the calendar was accepted by Catholic countries, but was long rejected by Protestants. It was adopted by England in 1702, when it was provided that the legal year should commence in future on the 1st of January, the old style, however, practically prevails in the accounts of the English Treasury—Christmas dividends are not considered due till Twelvth Day. The first day of the Chancellor of the Exchequer's financial year is the 5th day of April, old Lady Day, and with that day the reckonings of our annual budgets begin and end.

General Wheeler says that more than a hundred colleges have sent favorable replies to a proposition which he made that each should take one or two Cuban youths for free education. Lord Kitchener's idea of establishing a college for Soudanese youths inspired this suggestion from the veteran General, who after a close study of the Cubans, has suggested this plan for the education of the Cubans as the best possible method of bringing them into closer touch with the spirit of American institutions

THE LOWELL TEXTILE JOURNAL.

A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid $1.00
Single Copies 10
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the fifteenth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

The boom in the cotton trade is now on.

∴

Peat from bogs is now used for textile fabrics.

∴

Photographs go through the mails at the usual rates.

∴

Because you were born in April, does not necessarily signify you are a fool.

∴

The new ribbon loom is said to have the speed of one thousand picks per minute.

The school should have more support from the citizens of Lowell and neighboring towns.

∴

The students of the Lowell Textile School have meetings and elect committees to perform nothing.

∴

The Principal of the Lowell Textile School has had several inquiries for young men to fill important positions.

∴

Nothing like success. The Lowell Textile School has added to its curriculum, German and Spanish languages.

∴

It is an unselfish and noble act of the large corporations of New England to restore to their employees the former wage schedule.

∴

The Legislative Committee on Education visited the Textile School to acquaint itself with the workings and methods of the school.

∴

We are glad to hear that another student of the Lowell Textile School has been appointed Superintendent of a Southern Cotton Mill.

We carry the finest line of BICYCLES IN LOWELL, = CASH OR CREDIT.

DAYTONS, JOHNSONS, MONARCHS. RING'S, 221 to 229 Dutton St., LOWELL, MASS.

Among the visitors at the Textile school last month were M. E. Hall, commander of the U. S. training ship Enterprise, and Norman G. Burton of the same vessel.

.·.

The classes in German and Spanish are well attended Tuesday and Friday afternoons. Instructor Paul Kunzer, Ph. D., Director, New England College of Languages, Boston.

.·.

On the 3rd of this month, upwards of one hundred thousand working people will have their wages advanced, the extra money will mean better clothing and in many families more food.

.·.

There have arrived at the School two gill boxes, one before, one after combing, from Hall & Stell, Keighley, England. These machines were built expressly for the school, after a careful personal inquiry into the needs of the Worsted Department by Mr. Alfred Stell, when he visited the school last summer.

It is a pleasure to note the enthusiasm with which the machines were received by the Department, and the alacrity with which both instructors and students donned overalls and jumper, losing no time in unpacking, wiping, and setting up the machines—even working on Wednesday afternoon.

.·.

We do not ask business men to patronize our advertising columns for charity, but that the benefit may be mutual and reciprocal.

The advertisements serve a double purpose, they make it possible for us to publish a paper by the financial help we get from the advertisers, and in return we place before the public the names of reliable business men, and we earnestly ask of our subscribers and readers to patronize those who patronize us, and at the same time let your friends know you have seen their advertisement in the Lowell Textile Journal.

Mrs. Girgle—"Roger?"

Girgle—"Well?"

Mrs. Girgle—"Something tells me that I may die before I wake."

Girgle—"Oh, go to sleep."

George H. Batchelder,
18 CENTRAL STREET,
REPAIRING AND SUNDRIES.
BICYCLES
From $17.25 to $75.00.
GOOD WHEELS AND FAIR TREATMENT.

A CAUTIOUS MAN.

"Before I went West," remarked the man who had just returned, "I had heard a good deal about Western hospitality. It is there alright enough, although at one time I came near thinking otherwise.

"While I was there I had occasion to visit a former friend, and while driving out where he lived I noticed that a bolt on my wagon had become loose. While I was examining it a native came along. The horses I was driving were spirited ones, and not daring to leave them, and seeing I would need a monkey-wrench, I asked the newcomer if he would go to the house near by and see if he could borrow one for me. As a further inducement I exhibited a twenty-five-cent piece.

'I'd like ter oblige ye, stranger,' replied the native earnestly, as he looked longingly at the money I held out, 'I really would. But, ye see, I've gone out of the accommodation business."

'Why?' I asked bluntly.

'Wull,' he answered, as he shifted uneasily about on his feet, 'last week I was coming along this yere road when I met a neighbor of mine. 'Bill,' said he, 'I wish ye would go up ter my house an' see if my wife was thar.' Wull, I like ter be accommodatin' an all thet, so I went. Right thar was whar I made my mistake, fer no sooner was I at the door then I was hit with a mop-handle, a skillet, three iron pans an' a few other things thet I didn't hev time ter take notice of. Of course she pologized when hit wus all over, sayin' thet she thought I wus her husband, but I can't see how thet matters any better fer me. That's how things stand, stranger. I'd really like to accommodate ye, I really would. Maybe hit's jes' es ye say it is an' hit ain't nothin' but a monkey-wrench thet ye want; an' then maybe yer wife lives up thar an' ye wish ter find out whether she is on the warpath or not. I can't afford to take any chances. I'm a married man myself. But if ye want ter go up thar I'll go with ye an' stand out in the middle of the road an' lend my moral support.' I concluded to risk the loose bolt and rode on."

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LOWELL TEXTILE JOURNAL.

CLASS ITEMS.

WM. R. MOOREHOUSE, Sub-Editor.

Examinations were held from March 6th to March 10th inclusive.

Echo from the drafting room: Who has stolen my thumbtacks?

Mr. H. C. Parker is not the only Parker in the school, there is "Moore" Parker also.

Teacher: Which Mr. Parker is B. M. Parker?

M-r-p-y: The good looking one.

A meeting was held by the Lowell Textile School Athletic Association March 2d and the following officers were elected: J. W. McAlister, president; A. B. Fels, vice-president; A. Stewart, secretary and treasurer. New members were enrolled on the payment of the fee of one dollar for each term.

Hitchcock was elected manager and Bailey temporary captain of the Ball Nine.

"O, art, what sins are committed in thy name." (By the Freshmen.)

"Es war einmal ein Mann."

Here's to the captain and manager of the '99 base ball team at the Lowell Textile School. The sentiment of the students is right with them and all hope to see a crack team developed. We undoubtedly have the material for a good team and its success only depends on organization and practice. A natural rival in this sport is the Lowell High School, and without doubt one game at least will be arranged with them. As we did not have the pleasure of meeting them in foot ball, every effort should be made to give the "tin soldiers" a few points in the way to play the national game.

We hope the students will back their sentiment with the ($1.00).

Is not the Textile School fortunate in the possession of such a good base ball cage?

FINE CANDIES.

D. L. Page Co

94 MERRIMACK STREET.

ARTISTIC PHOTOGRAPHY

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..HAYDEN..

196 Merrimack St., Lowell, Mass.

Why don't the committees "get a move on?"

I don't know what's the matter with me.

I didn't break it.

The following story is told of a Haverhill man who is a chicken farmer, of an economical turn of mind:

Wishing to increase the quantity of his hen food without extra cost, and at the same time fool the hens, he mixed with it a quantity of sawdust. Shortly after he set thirteen of the hen's eggs with the extraordinary result, that when hatched out, twelve of the chickens had wooden legs, and the thirteenth was a wood pecker.

Where's my dog?

It was the dog and its master who said, Fitchburg needed a bath.

Why does the sub-editor take such an interest in the Rogers Hall School?

Would the temperature of the lecture hall melt the mercury in a thermometer?

Why is the office of the Lowell Textile School so popular with certain students?

What undaunted student gave the Textile School cheer on a public street recently?

Base Ball.

The base ball season will soon be with us, and let us try not only to have a first-class team but give to it the support which it deserves.

There are several good players in the school, and also several who were in last season's team. Last season our team played several games, and while we did not win many of the games, we made the other teams hustle to beat us (?).

Let us try and make an improvement on last year's record. We must support the team not only financially but by attending the games and cheering for the team. We can not become enthusiastic of course if we do not have a winning team, but we must not forget that it is impossible to secure a winning team when the students take little or no interest in it.

THORPE ...& BAILEY, Book and Job Printers,
52 Palmer Street, - - Lowell, Mass.

Therefore let the students show their interest in this year's base ball team by assisting it in every way possible. Attend the home games (and out-of-town games if possible), and cheer for the team. When the members of the team are aware of the fact that members of the school are present at a game it will serve to inspire more life into their playing.

The two essential things for a successful base ball team are support from the members of the school and good, hard, earnest practice by the candidates for the team.

Let each member of the team take interest enough to devote a share of his spare time to put in some practice and by so doing there is no reason why we should not have a winning team.

If we do not win the first game the players must not get discouraged, as it only shows that harder and more earnest practice is necessary.

Manager Hitchcock has already arranged two games with the Lowell High School team, for April 26th and May 17th. "1901."

So the lady golfers are not coming to America after all, and it was only a hoax. So Miss Isette Pearson writes, and Miss Isette Pearson should know, as she is the secretary of the Ladies' Golfing Union.

Nothing could more forcibly illustrate the spread of the game of golf amongst all classes than the fact that a cheap paper like the New Penny Magazine should think it worth while to devote several pages to a golfing incident. It would be hard to go anywhere now, and find anyone who did not know, or had not some interest in the game in some way or other.

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PERSONALS.

James Broadbent of the Lowell Textile School has taken charge of the spinning in the Mammoth Springs Cotton Mills, Mammoth Springs, Ark.

Thomas E. Aniley, formerly with the Lowell Textile School has accepted a position with the Amsterdam Woolen Co., Amsterdam, N. Y.

James H. Cuttle has accepted a position with the Arlington Mills Company, Chauncy street, Boston, Mass.

Pascal J. Boyd, an evening student of the Lowell Textile School; succeeds W. L. Saunders as superintendent of Mooresville Cotton Mill, Mooresville, N. C.

W. Maxwell Hastings, the first student in the Lowell Textile School, is designer for the Bemis Mills, Watertown, Mass.

A. R. Ramsdell, a day student of the Lowell Textile School, has accepted a position at Whitehall, N. Y., as superintendent of combing and carding of hosiery yarns.

Prof. Schwamb, Director of Shops, Massachusetts Institute of Technology, and in charge of Machine and El. Mechanism Design, was one of the visitors to the School, Thursday, March 16th, 1899.

"Now children," said the Sunday school teacher, "can you tell me of a greater power than a king?"

"Yes, ma'am," cried a little boy, eagerly.

"What, Willie?" asked the teacher benignly.

"An ace, ma'am," was the unexpected reply.

Kind Party—"If I give you this penny, what will you do with it?"

Johnny, sarcastically—"I'll be honest with you guv'nor, I'll spend it in riotous living."

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THE ORANGE BLOSSOM.

Like all familiar customs whose origin is lost in antiquity, the wearing of orange blossoms at a wedding is accountable for in various ways, says Public Opinion. Among other stories is the following pretty legend from Spain: An African King presented a Spanish King with a magnificent orange tree, whose creamy, waxy blossoms and wonderful fragrance excited the admiration of the whole court. Many begged in vain for a branch of the plant, but a foreign Ambassador was tormented by the desire to introduce so great a curiosity to his native land. He used every possible means, fair or foul, to accomplish his purpose, but, all his efforts coming to naught, he gave up in despair.

The fair daughter of the court gardener was loved by a young artisan, but lacked the dot which the family considered neccessary in a bride. One day, chancing to break off a spray of orange blossoms, the gardener thoughtlessly gave it to his daughter. Seeing the coveted prize in the girl's hair, the wily Ambassador offered her a sum sufficient for the desired dowry, provided she gave him the branch and said nothing about it. Her marriage was soon celebrated, and on her way to the altar, in grateful remembrance of the source of all her happiness, she secretly broke off another bit of the lucky tree to adorn her hair. Whether the poor court gardener lost his head in consequence of his daughter's treachery the legend does not state; but many lands now know the wonder tree, and, ever since that wedding day, orange blossoms have been considered a fitting adornment for a bride.

The custom of wearing orange blossoms in the hair by the bride

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EGYPTIAN COTTON, Etc.

upon her wedding-day is in France a matter of much pride and importance, inasmuch as it is a testimonial of purity, not only of the bride herself, but of the integrity and morality in the character of her relatives.

In the province of Franche Comte its adornment is considered a sacred right, obtained by undoubted character, and as such proudly maintained.

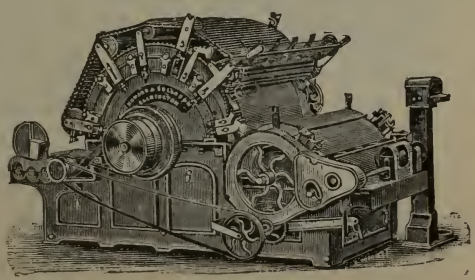
Should any act of imprudence in early life, implying even a suspicion of a taint upon the chastity of the maiden, be known, the use of the orange blossom is sternly forbidden; indeed, should the female attempt to wear it on the day of her marriage, she would be encountered at the church door by the village lads, violently seized and the emblem of purity degradingly torn from her hair; nor would the ceremony be allowed to proceed until all the trace of the flower thus profaned had disappeared from her person.

In almost every village or small town in France the bride entitled to wear the crown of orange blossoms has this beautiful certificate of her purity either framed or placed under a glass shade and it is religiously preserved if possible even through generations, as an indisputable testimonial of undoubted character.

The mother of an unnatural child never dares assume, not only the orange blossom crown, but even the white dress and veil, upon her wedding day, these habiliments being considered to belong only to the pure.

Should such an attempt be

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made, the most bitter ridicule, the most unmerciful sarcasms would accompany her and her unfortunate husband to the altar.

NATIONAL GREETINGS.

"How can you?" That's Swedish.

"How do you are?" That's Dutch.

"How do you stand?" That's Italian.

"Go with God, Senor." That's Spanish.

"How do you live on?" That's Russian.

"How do you perspire?" That's Egyptian.

"How do you have yourself?" That's Polish.

"Thank God, how are you?" That's Arabian.

"May thy shadow never grow less." That's Persian.

"How do you carry yourself?" That's French.

"How do you do?" That's English and American.

"Be under the guard of God." That's Ottoman.

"How is your stomach?" Have you eaten your rice?" That's Chinese.



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PUEBLO POTTERY AND FABRICS.

In the small house-cell or in the white sunlight the potter sat, and, with scarcely any tools at all, fashioned such specimens of the potter's art as to challenge admiration from us, with all our appliances. The use of the potter's wheel was unknown, and the "throwing" of a shape by this means, out of the question; but with a hollow bit of basket-ware or a piece of broken pot for a support, all the forms, from a simple food-bowl up to the largest and most elaborate water-jars, were built up by coil on coil of clay, smoothed or modeled in pattern as the vessel grew, and when one examines some of the ancient pieces. notably those excavated by Dr. Fewkes of the Smithsonian Institution, one can but marvel.

Then came the decorating; and in every case, from the simplest to the most elaborate and intricate symbolic design, one must confess that the Indian uses the truest inceptive and fundamental art principles. There never is any waste of energy in "effect;" the design always means a concrete thing which appeals to the understanding of the Indians, for whose use the utensils are. Through these same pottery forms and their decoration runs one of the strongest chains binding the old to the new. Near me are two tinajas, or water-jars. One is many generations, perhaps centuries, old; the other perhaps five years; and yet in shape and general decoration they are much alike, and if the newer one was properly "toned" they would pass as the same period. Near the potter, gossiping with her neighbor, sits a woman weaving;

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and here a change is seen. They had no wool then, cotton and skins being, with the yucca, the only textile. Yucca was to the Indian what the bamboo is to the Asiatic. It gave them needles and thread, and cloth to use them on, and entered in a hundred ways into the economies of daily life.—Fernand Lungren in the Century.

ORIGIN OF PORCELAIN.

Francis H. Eizetelly, "A Chat About China" in the Woman's Home Companion writes interestingly of the introduction of fine porcelain into Europe:

"The word porcelain, as applied to china pottery, originated in Japan during the 13th century. The Chinese, the pioneers in the art of porcelain manufacturers, began to make it nearly two centuries before the Christian era, and so careful were they to guard the secret of the art that nearly 15 centuries lapsed before their neighbors, the Japanese, got any inkling of it. But once in their possession, the wily Japanese lost no time to profit by their knowledge. The few intrepid navigators of those days brought samples of both Chinese and Japanese ware to Europe, but not until early in the 16th century did a trade in it of any extent take place. Among the early importers were the Portuguese traders who had settled on the Japanese coast, and to them, it is claimed, we owe the word porcelain, derived from the Portugese porcelana, or sucking pig. When the Portugese traders first saw pieces of Japanese ware, they were struck with its translucence, which somewhat resembled that of the cowry-shell. The cowry-shell, in turn, resembled in shape a small sucking pig, or porcellana; hence, our 'porcelain.'"



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His Pharmacy is first-class in all respects.
ALL GOODS RELIABLE.

A NEW USE FOR SPIDERS.

In the professional school at Chalis-Meudon, the "Industrie Textile" states that spiders have now to spin for the benefit of the balloons which are used for scientific and military researches. The spiders are grouped in dozens before a reel which withdraws the delicate threads. One spider can give a thread from 20 yards to 40 yards in length, after which performance it is released. The threads are of pinkish hue, and are washed to remove the sticky surface layer. Eight threads have to be combined. The resulting texture is much lighter than ordinary silk of the same bulk, and strong cords for military balloons can no doubt be obtained in this way.

THINK IT OVER.

Virtue is the fairest of all,
Vice is the most hurtful of all,
Thought is the most swift of all,
Hope is the most common of all.

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Write for information concerning our new Automatic Cotton Dryer.

Lowell Textile Journal



WILL NELSON.

The town of Preston, Lancashire, England, where the subject of this sketch was born, is of historic note.

It was during the reign of the Saxon king, Athelstane, that the name of "Priests' Town" was first applied to this district, although what are now the suburbs of the town, known by the abbreviated

name of "Preston," were founded as Roman colonies.

It was here that Cromwell fought one of his most decisive battles. The Pretender also proclaimed his right to the throne from the "Old Market Cross," and many other events of like nature.

But it is not for political history alone that the "Proud Town" is noted, but that it is now, and has been for a number of years, one of the principal manufacturing towns of Lancashire. There are about 130,000 inhabitants in this place, and to find employment for a goodly portion of the population there was, according to the latest returns available, 1,652,668 spindles, making a weekly production of 58,016 lbs. of yarn, also over 50,600 looms, besides other industries, such as the building of looms, newspaper printing machines, locomotive works, etc.

It was in this town that the great inventor of the spinning jenny was born, namely Richard Arkwright, and also where the now famous machine was first brought to the knowledge of the public. No wonder, then, that the subject of this article has had a desire since the first day he stepped into the mill to excel in the art of manufacturing, especially from a practical standpoint, and more so when we gather that he belongs to a family that were closely allied to manufacturing, the grandfather on the maternal side having charge of a yarn mill and the grandfather on the paternal side being a steel roller maker, besides his own father being in charge of spinning until poor health forced him to resign his position.

The boy Will, when but twelve years of age, had the good fortune, knowing he had to go to work, to obtain employment in a first class dry goods and general drapery store, and the varied fabrics and yarns that the young fellow came in contact with during the three years that he worked at the store has been of inestimable value to him, for then he gained an idea, somewhat, of what was required for the counter to be both pleasing and salable.

At the end of the three years it became a necessity to decide as to what should be the future calling for a life work, and the mill got the decision, and again fortune seemed to smile her best in the matter of a place of employment, for through the kindness of his Sunday School superintendent who, by the way, was also superintendent of the mill, the boy obtained employment in the harness room of the Springfield mill, owned at that time by Mr. Richard Goodiar, now R. Goodiar & Co., Ltd.

One and a quarter dollars per week were the wages paid for the lowest job in the harness room, and here the good fortune that was dogging the footsteps of the young employe was shown. Not in any way in having little work, no; but by the fact that he had obtained employment in one of the representative jacquard mills of England, in their class, and not only that, but in a mill where, at that time, most all who were employed there, had started at the bottom rung, and in a place where it was almost impossible for a young or middle-aged person to obtain employment, very few changes being made in which outsiders were given the preference. And the young person is indeed fortunate who can obtain employment in such a place; and by starting at the bottom the opportunity is given, if merit and ability are shown, to pass through the different stages until they have attained the best the employer can give to the employed.

A desire to succeed soon gained a reward, for after several months in the harness room, an opportunity was offered to enter into the weaving shed. The opportunity was gladly taken. Here, also, the person must commence at the bottom and climb step by step.

A heald piecer, as they are called, is the first job to be undertaken. This includes the piecing up of all jacquard harness that may break down on a certain number of jacquards; also the machines must be kept clean and well oiled, spare moments, if there are any, are spent in preparing for advancement.

The next step higher is "a helper," that is helping the fixer.

This is the true testing stage, for on the ability shown at this time depends what success will be attained in the future. This critical stage was passed successfully, for owing to the sickness of one of the fixers there was a vacancy to be filled by a helper, Will being the fortunate one chosen to fill the vacancy. Now came the realization of what it meant to be held responsible for work performed; but nothing daunted, he stepped into the work determined to uphold the family motto, *Nil Desperandum*, his father often singing it to him at eventide to comfort and to cheer. For six months this temporary charge was held. The fixer returning, there had to be a return to the helping stage, but about this time the jacquard trade became very dull, and the helpers were given other work to do, and as is often the case in a thorough jacquard mill, the jacquard harness

is tied up out of the way and dobbies or plain work substituted, and during this dull period the known helper divided his time between the dressing room and the weaving shed, another fortunate step. For several months the dull period lasted, but trade became brisk and a new weave shed was built, and realizing that some one would be required in the new place, permission was asked for and granted to spend extra time in the new shed during the fixing up of the first instalment of machinery, and to the overseer of weaving, Mr. James Smith, our helper was greatly indebted for the many kindnesses shown. The helper was then given the job of starting up the new machinery in the new shed. This meant that the overtime helper had left behind the intermediate stage and had entered into the contest of life on his own responsibility, but thanks to the employers, every encouragement was given to those who endeavored to help themselves, and everything whereby a workman could better his work and position was given attention to by the overseer. For several years this position was held and during the evenings for two winters the subject of this paper was attending the evening classes in the Preston Technical School and came through creditably.

In 1891, a person who had charge of a mill in Chorley, Lancashire, and who at one time had been employed at the Springfield mill, offered William the charge of the jacquard weave room, which was accepted, under the promise of further advance of pay if the average production from the looms was increased in a month's time. Not only was the production increased but the quality was advanced to such an extent that the promise made was merited.

On returning home to Preston the first Saturday afternoon after taking charge of the place in Chorley the young man met with a great surprise, several weavers from the old mill being gathered together at his home to make him a present on behalf of the weavers of a handsome marble time-piece as a token of their respect, and we know that this time-piece is held in deep regard, and as a very pleasant reminder of the old mill and its associations.

The position in Chorley was held for several months when another one was accepted under the firm of Wilding Bros. This change was made so as to gain additional knowledge on lenos. After several months had elapsed the opportunity was offered to return to the old place of employment, and it is almost needless to state that it was accepted.

The 4th day of June in the year 1892 saw the young man on his way to this country to endeavor, if possible, to step up a little higher in the ranks of life. There were the customary objections made by friends who could foresee a great future if only he would stay in the country of his birth and how he would fail if he stuck to his resolutions. That has yet to be seen. The first place where Will was located was in Taftville, Conn., and the Ponemah mill was then undoubtedly a standard mill for its class of goods and there was a great range of cloths made in that mill. A few months after his settlement in Taftville he was elected assistant superintendent of the Sunday School and later in the same year took charge as superintendent. When about two years had passed an offer of a responsible position was made from one of the largest Silk Manufacturing firms in New York state, but owing to existing circumstances he was unable to accept the position. In June, 1897, a position was accepted in the Lowell Textile School as first assistant in the weaving department. Toward Christmas of 1897 the position as principal of the weaving department was given to Mr. Will Nelson, and that position is still held by him.

At the close of the season of 1897-'98 a parlor time-piece was presented to Mr. Nelson as a token of the regard that the second year evening weaving class had for him.

May success attend his efforts.

GIFTS TO THE LOWELL TEXTILE SCHOOL.

There has been given to the school during the last month the following:

A blower from B. T. Sturtevant & Co., Jamaica Plain; size kettle from Lowell Machine Shop; cotton yarn from Arlington mills, Lawrence, Mass.; a large quantity of woolen yarn in assorted colors from M. T. Stevens & Sons, North Andover, Mass.; piano card cutting machine for Jacquard designs from John Royle & Sons, Patterson, N. J.; a quantity of sizing for cotton warps from S. R. Wattles, Canton Junction; shuttles for hand looms from Jacques' Shuttle Co., Lowell. All these will materially aid in the work of the school, and the builders and donors may rest assured that the gifts are thoroughly appreciated.

VOTE, SEE PAGE 29.

THE NORTHROP LOOM.

The 19th Century, which is fast hastening to its close, has been one of the most remarkable periods in the "World's History." Since the year 1801 to the present date more inventions have been thrown out upon the world for the benefit of mankind in general than was introduced before. The blessings of civilization are not only appreciated more in the home land, but they have been carried to parts hitherto unknown, and it is always owing to inventive genius, that faculty placed within mankind by a Supreme Being, which enables a person if the faculty is but used aright, to not only overcome the circumstances in which he is placed when ushered into the world, but to step up above the present surroundings. There may be obstacles, but there is no bar to the progress of the determined man. Strive for the mastery, but strive lawfully is a true motto, and one if followed out as stated, "Lawfully" is bound to lead to success.

While in conversation with some of the officials of the Draper Company, who make the Northrop loom, the following facts were gleaned, and the facts were as I believe told as encouragement for another. The majority of those in charge of the different parts of the plant of the Draper Co., are men who have risen up in the employ of that company, persons who were receiving an ordinary worker's pay, when the company were considered as on a low scale amongst the manufacturers and producers, but as the firm gradually advanced, the officials recogized that those who are now in charge, were men who were not afraid to express a thought or tell of an idea that would be of ma terial benefit to their employers who were endeavoring to attain the position they now hold, that is amongst the first rank of producers, either as to machinery or manufacturers of cloth, and naturally those who were amongst the masses at the bottom rung of the ladder, are now reaping the reward for such services, and any workman who endeavors by the best he knows how to further the interests of a true employer, is bound to

receive recognition sooner or later. The positions that Mr. Day, and the head draughtsman of this firm holds are two examples of what can be attained by a workman doing his best for his employer.

If the men in the employ of the Draper Co. had kept to themselves the ideas which are now put forth, by believing in that utter fallacy, that if you give out a thought to another you are but destroying your own chances for employment, simply because you are making another more on a level with yourself, so bringing them into the contest of life on an equal footing, and which is believed by a great number of persons, but never were ideas more utterly at variance with the advance of mankind than these, for no man has need to fear his position who has any ability at all to master the position he is trying to fill, simply because he tells thoughts and ideas that have helped him to gain his position; this makes him strive to retain his position, and by so doing that, new ideas are spread abroad. If these men had believed in this fallacy, we should in all probability never have had the marvellous piece of mechanism that is presented in the Northrop loom, a loom that embodies within itself a combination of parts of motion, that concentrated as they are, make up one grand whole piece of mechanism, that stamps the loom as one of the greatest inventions of the century.

And unlike a number of inventions, it is not a mere toy or even a piece of mechanism alone, but it is of practical value, and also is not intended, nor does it as some claim, destroy a person's chance for existence, but rather to better his condition in the civilized world. "Better a man's condition, and he will endeavor to better his position." And how will it better his condition? Why by the fact that as soon as the manufacturers have come to realize the tremendous benefit to be derived from the use of the Northrop loom, they will then be more extensively used than they are at present, and there are 30,000 at least used at the present day; and if the cloth can be produced at a considerable less cost than formerly, and in sufficient quantities, the buyer will be able to purchase that article at a less cost also, and by this means be better able to replace worn out apparel.

Take for an example, as a benefit, the curtain industry, which has undergone such a great change since the introduction of the Northrop loom.

A curtain of all grades can be obtained at about one-third the

cost it formerly was, and no one can deny the fact that a curtained window is far more beautiful and makes the home look more cozy than an uncurtained window. And not only with the curtains, but being enabled to obtain through the increased production at a cheaper rate, a cloth with printed figures upon it, any one is better able to make their surroundings more congenial, and for this alone, "congenial surroundings," the loom that produces such an article is well worthy of recognition.

Does not congenial surroundings tend to make a man feel that he would like to climb higher and higher so as to better his position? Certainly it does, hence the former remark. And while on the theme of the advantages that are being and will be derived from the Northrop loom, the following will not be out of place. We are yet able to find in some of our power weave rooms persons who in their younger days were hand loom weavers; they remember the tremendous opposition that was brought to bear against the use of the "Power Loom," claiming that it would destroy man's chances for existence. Has it? Mankind is better situated today than ever before, and there are 6 to 8 times as many ordinary power looms, run by one person, as what was run by the same person on hand looms, and if with an increase of 6 to 8 times on the production of a few years ago, and yet it is to be admitted that man is in a better position than ever before, why then, should not the same rule carry with regard to three times the advance of production on the present rate, and mankind be just as well or better situated than at present, and especially when we consider the increased ratio of population.

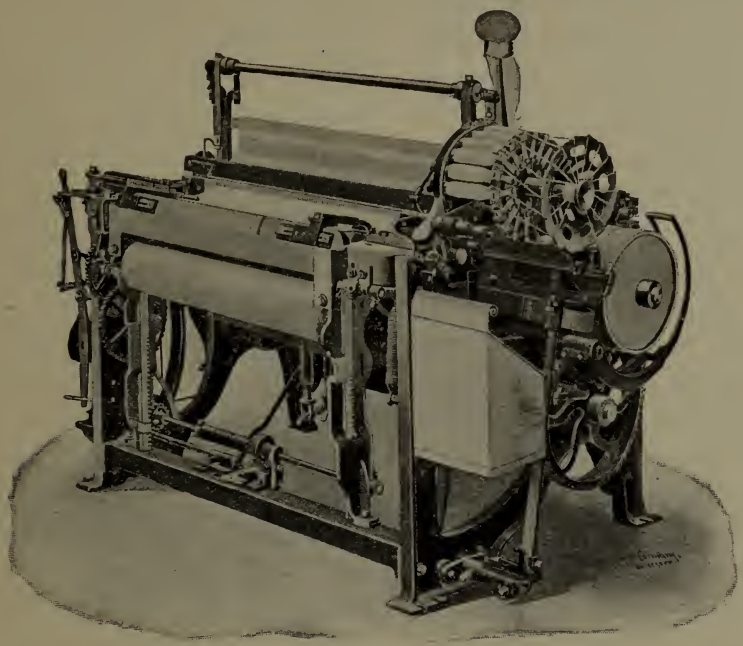
The writer realizes that he has taken an unusual course to show forth the value of the production of a certain machine, but often by taking an unusual course and stepping out of the rut, formed by the constant imitating of others, and simply re-writing and copying what others have wrote before. Instead showing results that are not usually credited to the rightful source, by such a diversion the best results often follow.

The writer also had an object in view when penning these words, and that was, if possible, to create within those who come in contact with this publication a desire for originality, also to make the best possible use of opportunities so as to rise above circumstances, for there are enough human machines in this world, and also if possible to destroy pre-

judice, for the man who is prejudiced is not the best of workmen.

The Loom.

So much has been said and written about the Northrop loom that hardly anything more can be written that will show some new feature. The hopper has been thoroughly explained, now



instead of having to stop the loom and take out the shuttle to fill it again with cop or bobbin.

By the inserting of cops or bobbins in the hopper or magazine, the loom is enabled to run without stop until the whole 15 cops or bobbins have been discharged from the hopper into the shuttle and the filling woven off, and even for a longer period than this, for whilst the loom is running the attendant can fill up the empty space in the hopper, so that unless the filling breaks twice in succession or a warp thread breaks, there is no need for the loom to stop on account of filling, only under the circumstances just mentioned, from the speed being started up in the morning to being shut down again.

The method of discharging the filling can possibly be understood from the following condensed explanation: A series of levers are connected to a rod that passes from the hopper, under the breast beam to a finger that is placed at the back of the filling stop motion slide.

A hammer is suspended over the bobbins or cops in the hopper, and on a stud fixed to the bottom of the hammer lever a small iron dog is placed; a spiral spring connects the dog to the stud, and during the running of the loom, a small finger that is attached to the end of the series of levers, keeps the dog from contact with the bunter or the lay; when the filling breaks, the fork slide is drawn back, allowing the finger connected to the levers to release the dog, and as the lay comes forward the bunter strikes the dog, forcing down the hammer, and the hammer forces a full bobbin into the shuttle, at the same time the empty bobbin is forced through the bottom of the shuttle into a can that is specially used to receive the empty bobbins, the shuttle being a self-threading shuttle; the filling drops in the slot at the top of the shuttle, and as the shuttle is thrown back for the next pick, the filling drops into the eyelet of the shuttle. If the filling breaks twice in succession the loom will stop. The device that accomplishes this is as ingenious from an original standpoint as any other part of the loom. A small lever which is attached to the fork slide, rests on what is called a brass cam slide; on the top of the brass slide is a bevelled projection, and underneath the small lever just mentioned there is also a bevelled projection; when the filling is all right and no discharge has been made the two projections are together, that causes the small lever to be raised up about three-eighths of an inch above the shipper rod lever. When the first break occurs, the fork slide is drawn back, this causes the bevelled projection on the lever to drop behind the projection on the brass slide, the brass slide being held from going back, and as the fork slide returns to its normal position, the small lever draws the brass slide with it, and in that way the point of the lever remains down, and if the filling is broken on the newly inserted bobbin the fork slide is drawn back, and the small lever being down, as it is drawn back, the point will press against the shipper rod lever, forcing off the shipper rod, but if the filling is all right after the first discharge the top of the elbow lever will press back the brass slide causing the small lever to be raised up from contact with the shipper rod lever, enabling the loom to continue to run.

The warp stop motion has also been thoroughly explained. The loom shown in the cut is fitted up with the steel harness heddle,

Brown Reed and Heddle Co.,
Loom Reeds, Slasher Combs, Harnesses, Harness Frames,
245 Market Street, Lowell, Mass.

which also acts as a drop wire when a thread breaks. There is a slot at the top and the bottom of the steel heddle which is about 7-8 inch longer than the space occupied by the iron shaft which takes the place of the ordinary wood shaft used in cotton harness. When either harness is down to form the bottom of the shed, the tension on the yarn keeps the heddles up so that the 7-8 inch space in the heddle is above the iron shaft, and if an end breaks the heddle will drop down this distance, and as the notched vibrator passes back and forth it will come in contact with the heddle that is down, and in this way the vibrator is prevented from moving its distance. This causes the lever that is connected to the shipper rod to be brought into play, and the shipper rod is knocked off, stopping the loom.

Looms are fitted up with the auxiliary stop motion. This is a motion similar in action to the former, but can be added to the ordinary cotton harness. So thoroughly successful is this stop motion, that it has been applied to 10,000 looms, apart from the 30,000 Northrop looms fitted up with stop motion and filling charger. The stop motion is not confined to two harness work, but is being fitted to drop box looms and three, four and five harness work. The cut also shows the high take up device. By the use of this device the front of the loom is open, enabling the loom to be fixed more readily. The great saving at this point will materially add to the production.

The cut also shows the system of one hand loom construction, the pulley being at the right hand side while the shipper handle is at the left hand. A loom that has the pulley to the left hand has the shipper handle to left hand also.

The Northrop loom carries out to the full what is claimed for it,

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DEALER IN
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and any one who has not seen this loom at work, the writer of this article will be glad to show and explain it to them, and whenever it is convenient without interfering with the classes, those in charge of the department are glad to show any one the machinery.

W. Nelson,
Principal Weaving Dep't.

OBITUARY.

We are sorry to record the death of George W. Bean, Jr., of Lewiston, Me.

Mr. Bean was one of the most popular students in the Lowell Textile School. He took a special course in weaving and textile designing and cloth construction to qualify himself for the position of superintendent. During his stay at the school he was at all times studious, bright, energetic and confident, possessing those qualities which are necessary to a successful business man, being punctual at all lessons, working diligently and thoroughly. When he left school to accept the position as superintendent in the Androscoggin Cotton mills, we were sure that he had a bright future before him, and under the guidance of his father, who is agent of the mills, we predicted that Mr. Bean, Jr., would make a success in any position he would assume.

The news of his untimely death was a great shock to his former companions and friends. Our deep sympathy and condolence is extended to the bereaved parents.

George W. Bean, Jr., son of George W. Bean, agent of the Androscoggin mills, was found in the tower of the mill at 6.30 on the evening of March 25, 1899. A revolver was found lying on the floor beside the dead body. On examination it was found that a bullet had penetrated the heart. This tells the sad, sad story.

T. C. ENTWISTLE,
MANUFACTURER OF
PATENT WARPING, BALLING AND BEAMING MACHINES,
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THE CARBONIZATION OF WOOL.

The successful extracting of cotton from union cloths without injury to the reclaimed wool has led to the extension of the process to raw wool for the purpose of ridding it of burrs and other particles of vegetable matter. These burrs are very difficult to remove, and often leave a large amount of waste during the process of extraction, while, if allowed to remain, they would do incalculable mischief to the yarn. There are two methods of dealing with them in general use — one is to pass the wool through a burring machine, which beats the burrs from the wool; and the other is to destroy the burrs by carbonization. The former method is most suitable when the wool contains large burrs; but carbonization is more economical for wool containing small burrs, straw, chaff, and other small particles of matter. One drawback in using the burring machine is that many of the smaller burrs adhere to the wool after being passed through the machine, and carbonization is afterward resorted to in order to reclaim the wool attached to them. For this and other reasons the chemical process is likely to totally supplant the burring machine in course of time. The process generally adopted is similar to the one followed in making extract wool. The burry wool is first saturated with a dilute solution of sulphuric acid, whizzed in a hydro-extractor, and afterward opened out and spread in a heated room. Here chemical action is quietly at work, the burrs are deprived of their hydrogen, and crumble to carbon, while the wool is liberated and washed.

Another method which finds favor is to saturate the wool with a solution of chloride of aluminum

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MANUFACTURER OF
REEDS AND LOOM HARNESS. ALSO BURR AND LICKER-IN
CYLINDERS FOR WOOL AND COTTON CARDS.
TELEPHONE 654-2. *Rear 256 Lawrence St., Lowell.*

(Al_2 Cl_6). After being whizzed and dried it is taken to a room heated to about 200° F., where it remains for a little less than an hour. Washing in fuller's earth and water follows, by which the chloride is removed and the residue of carbonized matter washed away. The prejudice which formerly existed against these methods of extracting burrs is rapidly disappearing, as experience has proved that if the wool be properly clean previous to carbonization, and the acid the required strength, no injury to the fiber is caused, neither is the felting of the wool in any way destroyed.

Trusts are not by any means an innovation of the present time, nor are they of modern creation. They have been in existence during the present century in some form or other, but they have not been universally successful. A trust is an entirely different institution from a co-operative society, or a combination of capital to obtain goods at reasonable prices.

The trust of today is the drawing together of all the powerful branches of a given industry, be it cotton, woolen, worsted, silk, leather, oil or sugar. It is the octopus of certain industries; it will draw within itself all the productions of such industries and monopolize their markets in order that it may fix prices as it pleases. It will crush out the life of the weak, and when these poor weaklings have ceased to exist up will go the prices and the consumer will pay into the treasury of the trust the money it has expended in crushing to death those who dared to oppose it.

VOTE, SEE PAGE 28, 29.

TALBOT MILL SUPPLY CO.,
Leather Belting and General Mill Supplies. Cylinder, Engine and Dynamo Oils.
8 Newbury St., Lawrence, Mass. TELEPHONE 139-4.

THE LOWELL TEXTILE JOURNAL.

A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid $1.00
Single Copies 10
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the fifteenth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

Not a step backward, but a stride out of the old ruts.

. . .

Success to Berry, Collier, Gaunt, Moir, Spedding, Wilton and Wilmot.

. . .

Send any item that you think will be of interest to the readers of the Journal.

. . .

The evening classes of the Textile Design department came to a close on April 28. The result of the examinations are most satisfactory and encouraging.

Be sure to read the article, "The Northrop Loom." It is original and worthy of the writer.

. . .

It is said Captain Brickett has no favorites and that the best man will be sent to the diamond. That's right, Brickett. Be firm.

. . .

We would suggest to the captain of the Base Ball team not to let enthusiasm run away with his usual good judgment.

. . .

The Textiles won their first game of ball. Will they continue to be so well disciplined? C. J. Brickett for captain was a good choice.

. . .

The exhibit by the students of the Textile School in the exhibition of the Society of Arts and Crafts was a most creditable display.

. . .

It is quite as unjust to deprive a man of a responsibility which belongs to him, and which he can rightly fulfil, as it is to defraud him of any of his rights. Those who do this under the *pretext* of relieving him from burdens too great to bear do him an untold wrong. It is a selfish appropriation of power and authority to the exclusion of justice and good feeling.

We carry the finest line of **BICYCLES** IN LOWELL, = CASH OR CREDIT.

DAYTONS, JOHNSONS, MONARCHS. **RING'S,** 221 to 229 Dutton St., LOWELL, MASS.

There were seven evening students at the close of the third year who had never been absent at roll call for the whole three years' course. Such young men will fill honorably any position they may assume.

. . .

The young men who have visited Carruther's Loom, Reed and Harness works, the Bleachery and Talbot's mills speak in the highest praise of the courtesy extended to them by the proprietors, agents and superintendents.

. . .

Honesty rewarded—with a tract! A gentleman now residing in a neighboring town had a curious experience the other day. Finding a twenty-dollar bill he advertised his find. Immediately it was applied for and the bill identified by a rich lady who expressed her profound thanks by sending the gentleman a religious tract.

The Society of Arts and Crafts held its exhibition in Copley Hall April 4–15. The display was most comprehensive, costly and beautiful.

. . .

Last Thursday a man came into my office. He had such a happy smile on his countenance that I ventured to remark: "Jim, what makes you so happy?" He answered: "Happy, well, I guess! Today when I opened my envelope there were two dollars more than I had last pay, and for the same quantity of work. Happy, is it? I'll tell you those two dollars will buy my two little children two pairs of shoes, which they have been in need of during the last two cold months. Happy, you bet! But my wife didn't smile. She sat down and cried, but she'll smile when she sees the new shoes on the little ones' feet."

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140 Middlesex Street.

F. E. HAINES, Proprietor.

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George H. Bachelder,
18 CENTRAL STREET,
REPAIRING AND SUNDRIES
BICYCLES
From $17.25 to $75.00.
GOOD WHEELS AND FAIR TREATMENT.

Professor Nelson writes very modestly. His early mill life was spent with the most noted cotton manufacturers. As he has advanced in life his experience has been in the weaving departments, which has qualified him for the responsible position he holds.

. . .

There are thousands of homes made glad with the advance in wages that has been paid to the weavers, spinners, etc., in the cotton mills. In some families the advance amounts to more than the sum of their house rent.

. . .

Notwithstanding the unfavorable outlook for base ball weather, Manager Hitchcock of the Lowell Textile School Base Ball team decided to take his aggregation of ball tossers to Glen Forest on April 12 to play their maiden game with the Lawrence High School nine. The weather was worse than bad, rain and snow falling continuously during the five innings played. The in-field was more fit for yachting than ball-playing. Owing to the bad weather and other unforeseen circumstances, and the fact that the Lawrence boys had to elect their captain on the field, the game was not called until 3.40 P. M.

The game opened with a shut-out for the Lowell boys, but they soon rallied and after the fourth inning had the Lawrence team on the run.

There was not a very large crowd present, but with a winning nine it is hoped that the Textile men will give it their personal support.

Buchan was the star of the Lowell team, striking out six men. Wing and Foster played well, the hitting of the latter being especially noticeable.

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For Lawrence Burnham was the prettiest player, scoring two double plays besides hitting well. The umpiring of Barber of Lowell and McCusker of Lawrence was of A1 order.

The score:

LOWELL TEXTILE.

	A.B.	R.	B.	T.B.	P.O.	A.	E.
Bailey, ss	3	2	1	1	0	0	2
Wing, 1	4	1	2	3	8	1	0
Buchan, p	4	2	1	1	1	3	0
Barr, lf	1	0	0	0	0	0	0
Bodell, rf	0	4	0	0	0	0	0
Fels, 3	3	1	1	1	0	0	2
Foster, c	3	2	3	5	6	1	1
Robinson, 2	3	1	0	0	0	0	0
Brickett, m	2	2	0	0	0	0	0
Leach, lf	3	2	1	1	0	0	1
Totals	26	17	9	12	15	5	6

LAWRENCE HIGH.

Burnham, ss	3	2	2	4	0	0	1
Santiford, 1	3	0	0	0	7	1	1
Balaher, m., p	3	1	2	3	1	1	1
D. Cullivan, lf	3	2	2	2	1	0	0
McCarthy, rf	2	2	1	1	1	0	0
Morrison, 3	2	0	0	0	0	0	2
Smith, c	2	1	1	1	4	0	2
Gatwood, 2	2	0	0	0	1	2	1
Haigh, p	2	0	0	0	0	0	0
Prescott, m	1	1	1	1	0	0	0
Totals	23	9	9	12	15	4	8

Lowell Textile	0	2	2	4	9—17
Lawrence High	1	1	3	1	3— 9

Two-base hits—Foster (2), Burnham (2), Wing, Balaher. Stolen bases—Bailey (2), Fels (2), Robinson, Burnham (2), McCarthy, Sullivan. First base on balls: By Buchan—Gatwood, Burnham, Morrison, McCarthy; by Haigh—Bodell (3), Bailey (2), Buchan; by Balaher—Brickett, Wing, Bodell. Struck out: By Buchan—C. F. Morrison (2), Gatwood (2), Haigh, McCarthy; by Haigh—Fells (3), Barr. Passed balls—Foster (3), Smith (4). Wild pitches—Balaher (3). Buchan. Hit by pitched ball—Foster. Umpires—McCusker (Lawrence), Barber (Lowell).

VOTE, SEE PAGE 28, 29.

A well known business man, referring to the success of his firm, said: "We attend to our own business and nothing else. You never hear of us being on the road nor out driving. We do not go to the theatre. We have no outside business—no ventures or speculations in oils, wild lands, patents or stocks. What money we have we put into our house. We take care of our business and our business takes care of us. We keep abreast of the times."

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SIMPLE LESSONS IN PHOTOGRAPHY.

ALBUMENIZED PAPER PRINTING.

Photographic printing processes are both varied and numerous, and in the following chapters we shall give an outline of the principal of them, recommending the student to take them up in the order in which they are here presented, and, as in the case of the developers before referred to, not to try a second before the first is thoroughly grasped and understood.

Albumenized paper printing is the oldest system of photographic printing extant, and is in most respects the simplest for the beginner to adopt.

Albumenized paper is simply a fine quality of paper, one side of which is heavily sized with albumen in which has been beaten up a certain proportion of an alkaline chloride, such as that of ammonium. The object of the albumen is mainly to keep the picture on the surface, thereby ensuring brilliance, for without it the photograph would be produced in the body of the paper and have a sunken, lack-lustre appearance. The chloride is added to cause the formation of chloride of silver, which is very sensitive to light, more especially when in contact with organic matter, such as albumen and free nitrate of silver.

As albumenized paper is now so readily and cheaply procured in commerce, and is also so well prepared, it is inexpedient that private consumers should attempt its preparation. It is rendered sensitive by floating it for two or three minutes upon an aqueous solution of nitrate of silver. There is always

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a certain best strength of this solution; but, unless one knew definitely the proportion of salt that has been mixed with the albumen, its determination is left very much a matter of doubt. For example, some albumenizers salt their paper so lightly that a silver bath containing thirty grains of nitrate of silver to the ounce of water suffices; but, in the absence of definite instructions, it will be found advisable to employ a solution rather exceeding, but not under, fifty grains in strength.

Having poured a sufficient quantity of such solution into a flat porcelain or glass bath, take up the sheet of paper by opposite corners, so as to form it into a curve, and place it neatly down on the solution, in order to prevent air bubbles forming on the coated surface, or any of the silver solution flowing over its back.

This must be done in a feebly lighted room, one by preference into which the light is admitted through yellow paper. Gas or candle light does not exercise any bad influence. In course of its duration on the solution the paper should be raised up by one corner by means of a pair of horn forceps, and examined to see if it is all uniformly wetted. In about three minutes it must be raised up and drawn over the edge of the dish, so as to get rid of the superfluous silver solution, and then suspended to dry. This may be done either by wooden spring clips (American clothes clips) or by laying it, back down, over a stout cord stretched across the room. Pieces of blotting paper should be placed underneath to absorb the drippings, and these should afterwards be placed away so as to have the silver recovered from them.

When quite dry the paper is ready for cutting up and being printed upon.

Printing from the negative is

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conducted by daylight in a wooden frame, the film side of the negative being in absolute contact with the sensitized paper. The light fails to penetrate the opaque parts of the negative, such as the sky, a lady's white dress or a gentleman's collar, but of course passes freely through the clear glass and the middle shadows, thus producing a reversed or positive result on the paper. The terms "negative" and "positive," therefore, will now explain themselves to the student. Let the printing be carried much further than it is desirable it should appear eventually, as by the "toning" and "fixing" operations the pictures become somewhat reduced. After the printing has been carried on until the shadows, by reflected light, have a slightly bronzed appearance, place the prints, one by one, in a dish of water, each being allowed to become quite wet before the next is added This removes most of the free nitrate of silver from the surface of the paper. The first washings ought, therefore, to be preserved, as the whole of the silver can be recovered, which materially diminishes the cost of outlay. The washing water should be changed two or three times, but it is scarcely necessary to keep any but the first washings.

The prints are now transferred, one by one, to the gold toning bath. The object of "toning" the print is to change the unpleasant reddish-brown hue, which it would otherwise retain, to a more agreeable color, as well as to increase its permanency by the deposition of gold upon the silver image. The acetate toning bath is that which will be found most generally useful, because after it has been made it retains its good working qualities for a long time, whereas some others will not keep good over one day. The acetate bath derives its name from the chloride of gold

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being placed in solution along with acetate of soda, and it is better that the bath be allowed to stand at least one day after its preparation before being used for the first time.

A reliable formula is:

Acetate of Soda . .	30 grains
Chloride of gold	1 grain
Water	8 ounces

After the prints are immersed in this they will slowly pass from the unpleasant red tone to a violet, and afterwards a cold blue color. As soon as they are seen to change from the purple to the blue tone remove them and transfer them, without washing, to the fixing bath, which consists of four ounces of hyposulphite of soda to a pint of water. In this bath they may be allowed to remain seven or eight minutes. Both in the toning and fixing baths precaution must be taken that the free action be favored by keeping the prints in motion, and not permitting two of them to stick together, as this will cause inequality of the toning action, while on no account must the fixing bath for negatives be used for prints. The object of "fixing" the prints is analogous to that of fixing negatives, inasmuch as fixation or dissolution removes the sensitive compound which has not been acted upon by light, and which, if allowed to remain on the picture, would eventually cause it to disappear. After remaining for the time mentioned in the fixing bath lift up the prints and examine each one by transmitted light, when a peculiar translucence will indicate whether the chloride has been quite dissolved out or not. Should such translucence not appear at first return them to the hyposulphite

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solution for one or two minutes longer. It is inattention to the prints at this stage that is the main cause of their fading in after years. Next place the prints in water, very frequently changed, until the hyposulphite of soda is thoroughly removed from the interstices of the paper. Some printers are so expert as to be able to ascertain this by the application of the tongue to the print, for if the soda be still present there will be a peculiar saline taste. It is well to wash them considerably beyond this stage so as to make sure.

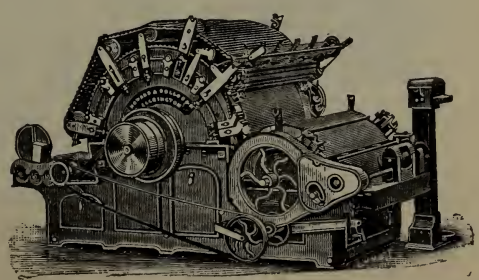
Next spread out the prints upon clean blotting-paper and remove the excess of water, afterwards hanging them up or laying them out upon a clean blotting-pad till dry.

ART AND CRAFTS EXHIBITION.

REMARKABLE WORK OF STUDENTS IN THE LOWELL TEXTILE SCHOOL.

The aim of the Society of Arts and Crafts is to draw the designer into closer relationship with the craftsman, or, in other words, the designer must be a craftsman, and the craftsman himself must be a designer. Under these conditions the resulting work would be of a higher quality. It has long been acknowledged that the designer in the textile trades must be a person who has had a thorough education in all the departments of a textile mill. In the cotton and linen trades it is necessary to have a knowledge of the cotton and linen fibre from the field and through all the various processes

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and manipulations to the finished cloth. In the woolen and worsted industries it is now very essential that the designer and manufacturer should have an extended knowledge and experience in all the departments of a woolen and worsted mill — from the fleece of wool, sorting, scouring, dyeing, picking, carding, spinning, warping, weaving and finishing.

Where can a young person get in a few years a general knowledge and insight into all these various departments?

There is no place, only a textile school that is equipped with the latest improved machinery. The exhibit in Copley hall fully demonstrated the utility of such schools. The student is brought in direct contact with every department of a mill. If the machinery for certain processes is not in the school the student has the privilege of visiting some local mill where he can see such machinery in operation.

The exhibit of finished fabrics is very creditable for the short time some of the students have been in the school. We would suggest that at any other exhibition there should be no unfinished cloth unless there was also a piece of the finished fabric for comparison. Among the most notable were J. W. Bailey, cotton and silk shirt-



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ing; C. F. Harmon, cotton and silk fabric; J. H. Cuttle, woolen suiting; A. A. Smith, leno stripe for misses' aprons; A. B. Fels and E. T. Tilton, woolen trouserings; Walter Gerrish, cotton ginghams; A. J. Pradal, several woolen suitings; S. E. Smith, worsted plaid dress goods; J. E. Perkins, woolen plaid suiting; C. T. Wing, woolen stripe.

The first year students have done remarkably well. Those favorably mentioned were L. B. Cranska, P. B. Parks and C. E. Foster.

There were several exhibits by the Women's Textile Design class, which were above the average: Worsted plaid dress goods, designed by Katherine Burrage; dress good pattern, designed by Edith C. Merchant.

VOTE, SEE PAGE 28, 29.

CLARISSE.

What a wonderful love was yours, Clarisse,
In those halcyon days of old,
When I was so young and you, Clarisse,
Spoke only of love untold.

What a passion was yours and mine, Clarisse,
What a heaven we lived, ah me —
When I was so young and you, Clarisse,
Were the queen of the life to be.

No sorrows or doubts were ours, Clarisse,
Ah me! but the world was fair —
When I was so young, and you, Clarisse,
Were a part of the ambient air.

And I knew I would die of grief, Clarisse,
Did death breath upon your life,
When I was so young and you, Clarisse,
Were pledged, love, to be my wife.

But that was long years ago, Clarisse,
You left me, I did not speak.
But I wondered who told you, *dear* Clarisse,
That I only earned six per week.

—Ormsby A. Court.

Men love to hear of their power, but have an extreme disrelish to be told their duty.—*Burke.*

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Lowell Textile Journal

TEXTILE AND TECHNICAL EDUCATION.

By FENWICK UMPLEBY,

Instructor of Textile Design and Cloth Construction,

Lowell Textile School.

Foreign competitors are always looking forward to that which will enable them to hold their position in the textile market. They are constantly seeking for the excellence of their high productions, not only in the high grades of textiles, but in everything else, for the people were, more and more, requiring objects of beauty to look upon, and because fashions were more likely to be led in the future by the intelligent and refined rather than by the ignorant and vulgar.

Their competitors kept themselves well informed as to what was being done in other places, and Americans should take pains to know what was being done in Europe. Our foreign competitors do not look for progress in a constant reduction of wages and longer hours, but were aiming to attain greater skill and taste.

Europeans attach great importance to Textile Schools and Museums of Textile Fabrics in which they have examples of every material and all the best things to be met with, and it is to these that they owed inspiration and very much of their advantage.

If we go back as far as the Franco-German war, when France was almost humbled to the dust, it set itself to the task of restoring its fair fame in the eyes of the world; and in no sense did it do this more than in its determination to make great efforts in the manufacturing industry, and probably in no other country had there been such great strides in every department of the textile trades. At Rheims there was great energy displayed, and most of this was put in the technical school, which cost $100,000, and an annual grant of $12,000 was made from the municipal taxes.



FENWICK UMPLEBY,

Instructor of Textile Design and Cloth Construction,
Lowell Textile School.

At Robeiox there was a commission appointed to consider how its trade could be improved, and this commission recommended that a new school be built at a cost of $300,000, of which sum $120,000 was to be supplied from the taxes of the town and $180,000 was to be granted by the government. They held the doctrine there that whatever benefited the trade of the city benefited the country.

At this school there are from 600 to 700 students attending the evening classes alone. In these places the manufacturers relied upon their superior workmanship and art in design, the greatest skill in dyeing and the equisite beauty in all their productions. These people are not satisfied with the perfection to which they have attained but are still striving at greater perfection.

In Lowell let them look around and see what extent high artistic talent was put into their manufacturers. I am not speaking of talent which copied the designs from high novelty silk fabrics, and which reproduced it in a worsted, woolen and cotton, but rather of the talent of a high order, that which originated real pictures which impressed the buyer by their good taste of their high style of novelty.

Perhaps you will ask me has not the worsted, woolen and cotton universally followed silk. My reply is why not let these great branches of the textile world strike out new lines of their own?

A hundred difficulties might be put in their way, but difficulties were put in the way that they might easily overcome — educate the citizens, give them a thorough technical education, and if it pays to employ high talent in the production of silk goods why should it not pay to employ high talent in the production of worsted, woolen and cotton fabrics?

One of the best mottoes I saw in Lowell's Labor Day procession was, "Higher Wages is Higher Civilization."

We know that the influence of the School of Art in Nottingham, England, upon the lace trade has been so great that they were almost able to dispense with the artistic designs brought from France and other countries, and so you will find if they put their shoulders to the wheel in this State of Massachusetts, they would have success quite equal in proportion to the efforts which were made. It is by such means that our trade in the future would be improved, and in proportion as they developed the intellects and the faculties of their people, just in proportion

would they enjoy new life and prosperity and bring about great advantage to the community.

A trade can only be kept alive, when in a sickly condition, by the production of novelties and new effects, but, unfortunately, when a trade stands in need of this sort of thing it generally has the least given to it, because there is not that spirit or willingness to expend time, labor and money when the results are uncertain, so that definite branches of production get less pains bestowed on them when they have the most pressing occasion for liberal catering in the way of production of novelties.

The manufacturer and designer are not educated for these emergencies. They have plodded along successfully in one routine of style and when the occasion arises for sudden change of novelties they are not equal to the occasion.

But we cannot work impossibilities, and we are at a disadvantage without technical education. A gentleman from Verviers, Belgium, a noted manufacturer of yarns, travelling in England, called at the Yorkshire college, England, and said that they had had a textile school for twenty-five years and were going to erect a new one and equip it with all kinds of machinery for the making of all classes of textile fabrics. This shows that they are determined to give the artisans full education for the position they have to occupy. A textile student should learn thoroughly the processes and mechanisms of the different parts of a factory with which he may be brought in contact through his profession.

Raw materials, scouring, mixing, carding, spinning, warping, sizing, drawing in, reeding, looming, weaving, shafting, gears and finishing, as errors in any of these departments will often upset his calculations entirely and his labor will be to a great extent lost. The most important part is the construction and build of a fabric which can only be acquired by a thorough training in the designing department. To be a successful manufacturer, one must know all the details of a fabric — the weave and its construction and the lay-out or specification of the cloth. The promoters of the Vienna school stated that the selling value of a piece of woven fabric is represented mainly by the character of the design it bears upon its surface, whatever may be the deficiencies of the warp or filling or other workmanship.

So fully is this department recognized in that city that it encourages this department by annually offering three scholarships for designing of the value of $630.

The commissioners on technical education visiting the cotton mills at Rouen and Lille were informed that a theoretical knowledge of the cotton fibre, its growth, structure and properties should be possessed by all engaged in its manipulation and most particularly a knowledge of design and of the loom should be sought by all foremen and superintendents.

Manufacturers of fancy cotton goods can only live by the attractiveness of the finished goods. However perfect or cheap, their profitable sale depends entirely upon the skill and taste of the designer, and therefore it was argued that the cotton industry depends much for its success upon schools of design and practical chemistry.

While at Crefeld, the commissioners visited the silk mills. In conversation with several gentlemen who showed us through their factories and schools we were much impressed by their enthusiasm for technical instruction and the hearty interest which they manifested in the weaving and designing departments. In regard to a new school, which was in course of erection, one of the promoters significantly remarked: It does not follow that the establishment of this school will render us independent of outside sources for designs or new ideas; we do not expect it, but to say the least it will raise the tone and knowledge of our rising manufacturers and foremen, and very materially widen the field from which the latter class may be selected by spreading technical education broadcast among the industrious and ambitious artisans.

The commissioners visited the silk and dyeing establishments of Switzerland and almost invariably found in the persons of managers and foremen high scientific knowledge combined with a practical and technical training. The proprietor and director of one large establishment had been a student at the Polytechnic at Zurich; he had afterwards gone to England. The commissioners found in France, Italy, Switzerland, Germany, Austria, Belgium and Holland, namely, that in nearly every factory or industrial establishment of importance the directing skill is supplied by men who have had a high scientific and technical education. In chemical knowledge the heads of departments in color-making and dyeing establishments are almost invariably superior to those of England.

Prof. Huxley, speaking on the education of the artisan says: "You must give him an education that fits him for the conditions of life, but it seems to me that what

is wanted as a foreman is a man of energy, punctuality, business habits and the power of dealing with men. These qualifications are most essential, and what you want besides in such a man is an intelligence sufficiently trained to be able to deal with new conditions and an amount of knowledge sufficient to enable him to know where to go, find more if he wants it. The place to go is to the scientific and technical schools.

Mr. Swire Smith, in speaking on trade depression and technical instruction, said as a rule England was beaten on the neutral markets, chiefly in those commodities in which she was beaten in her own market, but the fact was that while we had been developing our machines, rivals had been developing and educating their men. While it was clear that many British industries had suffered both in France and Germany many of the industries would have been ruined had it not been for the results of their technical edncation. The Paris Chamber of Commerce has spent over $400,000 upon the school for advanced commercial studies. The state, the municipal council of Paris, the council general of the Seine, chambers of commerce, the Bank of France, all maintain scholarships, which, though of recent creation, have given very considerable results, for among the past pupils 30 are to be found in England, 17 in America, two in Australia, two in China and one in Japan, and it is important to note that nearly all the firms have employed old pupils, applying exclusively to the school to recruit their staff.

THINKING.

'Neath shading trees I love to roam,
'Midst meadows sweet—and dry,
By babbling brooks in bosky ways,
Neath sun, or starlit sky.

I love to scale the mountain steep,
O'er glaciers, chasms, rocks,
On beetling cliffs I sigh to creep,
But fate against me knocks.

I love to bowl the briny seas,
And list the sailors' song,
And hear the wind-swept cordage creak—
Ah, me, but life is wrong.

I love to sit and dream of naught,
Or conjure fancies' fair,
Ah, me, but life's an awful frost
When one is not an heir.

—Ormsby A. Court.

We hope you all have enjoyed your excursions to the various mills and workshops in Lowell and Lawrence. That is one of the great benefits to be had by attending a school centrally located and surrounded by manufacturing of all classes of fabrics. Here we have cotton, worsted, linen, woolen and carpet mills, and machine shops, making every kind of machinery. There's not such another place in New England.

THE EARLY HISTORY OF MANUFACTURING IN LOWELL.

By E. W. THOMAS, Agent, Tremont and Suffolk Mills.

Near as we are to the incoming of the 20th Century, and the ending of the present one, it seems fitting at this time to look backward over the past one hundred years, and follow the history of the great industry that has made Lowell in the past a household word, and given it the name of the "Manchester of America."

Although cotton spinning and weaving by hand was in vogue, it was not until practically 1800 that power machinery was introduced in this country, although for some 30 or 40 years up to that time it had been used in England. The Slater's Mill in Pawtucket, R. I., and a yarn mill in Beverly, Mass., are believed to be the first in New England. Waltham, Mass., however boasts of having been the first town where an incorporated company was organized to manufacture by power, this incorporation having been effected in 1808. This company is in successful operation today, and is known as the Boston Mfg. Co. It is in its 91st year of its existence. The incorporators of this company, encouraged by its success, began exploring the country and streams about New England, in order to obtain a location not too far away from Boston, upon which to build and operate another mill or series of mills. Their investigation led them to finally select what is now Lowell as the most promising site upon which to locate. At this time the Locks & Canals Co. had a canal, which exists at present in almost the same channel, extending from the Merrimack river (near the Vesper Boat House) crossing Broadway following the side of Middlesex Street, passing between what is now the Lowell Machine Shop and the Hamilton and Appleton mills, passing across Central Street, and thence into the Concord River, near and adjoining the Middlesex mills. The canal had been in use for many years as a means for conveying lumber and general merchandise from New Hampshire to Lowell and vicinity. Lowell at this time being the central distributing point of New

Hampshire valley and near the Lowell Machine Shop. These investigators from the Boston Mfg. Co. were Patrick T. Jackson, Nathan Appleton and Francis C. Lowell, who perceiving the advantage of the already existing canal at once quietly began the purchase of the land lying northerly and easterly of the canal already alluded to. This was all farm land. They then purchased of the old Locks & Canals Co. all their rights in the canals and river, which the original company possessed. The new company took the name of the Merrimack Mfg. Co. A canal was built in 1822 from about opposite the Kitson Machine Co. down Dutton Street and as far as the present Merrimack Co. In 1822 the Merrimack Mfg. Co. was established as a manufacturing com pany and put in operation. Lowell at once commenced to grow rapidly, the opening of the mills drawing many young men and women from the surrounding towns and villages. In these early days the hours of labor were long. It must, however, be said that the work produced per operative was not equal to what is today produced per operative in less hours per week. The machinery of those days was crude, slow running and not as susceptible of production as that of later years. Public interest was rapidly increased upon the completion of the Merrimack Co.'s plant, and after three or four years the Merrimack Co., who at this time owned about all the land in the city, reconveyed back to the Locks & Canals Co. such lands and water powers they did not require in their own plant. Then the present Locks & Canals established a machine shop, built and equipped mills with machinery, and sold water powers to other companies. Soon after the establishment of the Merrimack Co. the Hamilton and Appleton mills were built, closely followed by the Tremont and Suffolk, and Lawrence. The increase in the number of mills soon exhausted the amount of water that could be drawn through the original canal, and in 1846 to 1850 a new canal was built from the Falls, running parallel with Pawtucket Street, and thence to Suffolk Street, where it connected with the canal running parallel with Suffolk Street, which had been built in 1831. From this time on various mills were built in the city, and all available water power used or bought.

The owners in the present canals and water power system are the following cotton mills: Merrimack, Hamilton, Massachusetts, Appleton, Tremont and Suffolk, Boott, and Lawrence. The Lowell Car-

pet Co., Middlesex mills, and Low-Machine shop are also interested. Each of these mills own certain numbers of mill powers, each mill power representing about 70 H. P. Beyond the ownership of these powers, any company may purchase, if they choose, additional water, in case they have water wheel capacity beyond the amount of water they own.

For many years the water power of this city was an object of great attraction, and was the great factor in the establishing of textile mills.

The canals of this city in the early days were of a character that attracted attention from all over the world as being of so advanced a nature. It is related that in those times Lowell was visited by more engineers to investigate the system than any other known point in the world.

Northern Canal, 4375 ft, built 1846-50.
Western Canal, 4472 ft., built 1831.
Tremont Canal, 575 ft., built 1831
Pawtucket Canal, 9188 ft., built 1798.
Merrimack Canal, 2586 ft.. built 1823.
Hamilton Canal, 1770 ft., built 1826.
Lowell Canal, 500 ft., built 1828.

For many years the water power of this city was an object of great attraction, and was the great factor in the establishing of textile mills in the city, owing to the cheapness of its cost. The time is, however, gone when we may hold this prestige.

The great and rapid strides in the cheap development of steam power has rendered water power at a far lower value than ever before, so that today cities like New Bedford and Fall River are rapidly increasing their number of mills, owing to cheap freight rates, and are not at all dependent on water power as motive power. Then, too, electricity has entered the field as a motive power. Mills are located, in some instances, in the South, miles from a dam or water power, the power being conveyed by wire the same as our street cars are run. So that, on the whole, one of the reasons that Lowell has not grown very much in the increase of cotton mills has been on account of more favorable locations having advantages that we do not possess.

LIST OF MILLS AND THEIR INCORPORATION.

Mills.	Incorporated.	First Agent.
Merrimack Mfg. Co.	1822	Kirk Boott
Hamilton Mfg. Co.	1825	Samuel Batchelder.
Appleton Mfg. Co.	1828	John Avery.
Tremont Mills,	1831	Israel Whitney.
Suffolk Mills,	1831	Robert Means.
Lawrence Mfg. Co.	1831	William Austin.
Boott Cotton Mills,	1835	Benj. F. French.
Mass. Cotton Mills,	1839	Homer Bartlett.
Lowell Machine Shop,	1845	W. A. Burke.
Bleachery,	1833	John Derby.
Middlesex Co.	1830	James Cook.
Carpet Co.	1828	Alex Wright.

I call your atention to the fact that the Hamilton Co. since 1825 has had but three agents, and the present superintendent, Mr. Rod-

liff, is in active service today, after over 60 years' service in the employ of this one company.

Mr. George Motley of this city served the Appleton Co. as Agent from 1831 to 1867, a period of 36 years, afterwards as Treasurer of the same company for 9 years.

Alex Wright served as Agent of the Carpet Co. from 1828 to 1852, 24 years.

Frank F. Battles as Agent of the Mass. Cotton Mills for 33 years.

J. B. Francis as Engineer of Locks & Canals for a period of 48 years.

I speak of these men, two of whom are today living, Messrs. Rodliff and Motley, having seen in their lives the wonderful growth and development of the manufacturing industry of this city It would be extremely interesting if the reminiscences of the old times could be given by these two men.

A few facts will now be given to show what kind of times the employee of the factory had in the good old days.

From a memo. book, kept by a leading official in one of our larger corporations, during the first years of manufacturing, which recently came to my notice, I present the following:

HOURS OF LABOR.

Began work: May 1st to Aug 31st at 5 o'clock. Sept. 1st to April 30th as soon as they can see.

Breakfast: Nov. 1st to Feb. 28th before going to work. March 1st to March 31st at 7 30 a. m. April 1st to Sept. 19th at 7 a. m. Sept. 20th to Oct. 31st, at 7.30 a. m.

Dinner: Through the year at 12.30 o'clock. Time allowed, 45 minutes.

Stop work: May 1st to Aug. 31st at 7 p m. Sept. 1st to Sept. 19th at dark. Sept. 20th to March 19th at 7.30 p. m. March 20th to April 31st at dark.

The following table gives the hours per day of labor throughout the year:

January and December,	11 hrs. 24 min.
November,	11 hrs. 56 min.
March,	11 hrs. 52 min.
February,	12 hrs.
October,	12 hrs. 10 min.
September,	12 hrs. 23 min.
May, June, July & Aug.	12 hrs. 45 min.
April,	13 hrs. 30 min.

Lamps were never lighted Saturday evenings. All artificial lighting was by small lamps, and whale oil was used. Heating was done generally by hot air furnaces. Only one mill, in 1835, was heated by steam, and that was the Middlesex Co.

The amount of machinery attended was not as much as now, and to show an example, I give the list of machinery in one of the mills of the Suffolk Co. in 1835:

Pickers,	2	13 males and 13 females.
Willows,	2	
Cards,	56	
Drawing,	24 dels.	

Speeder spls,	96	1 girl 24 spls
Stretchers,	360	1 girl 45 spls.
Spindles,	5888	1 girl 256 spls.
Warpers,	8	4 men and 30 girls
Dressers,	10	
Looms,	176	1 girl to 2 or 3 looms.

Total of 271 hands.

The question is often asked as to the condition of the health of the operatives at this time. Perhaps no better answer could be made than that made by the late W. A. Burke of this city, at a meeting of the Cotton Manufacturers' Association some years ago, when he read a paper on the comparative wages earned and the production of the earlier mills as against the more modern. Mr. Burke claimed, from actual experience, that in his opinion the female operatives did suffer from the long confinement, although others, and especially physicians, claimed that such was not the fact Be this as it may, it is undoubtedly the fact that health was not improved any, even if one held their own. This much may be deduced, that for many years many of the prominent men and women of this city were once factory employees, and since leaving the mills have occupied some of the higher positions in the social and business life of this city.

State legislation has effected much in sanitary improvements, purer air in factories, and shorter hours. The production, in lbs. or yards, per operative in 60 years has quadrupled, due to the great improvements made in operative machinery. Where in 1825 one weaver had but two or three looms running from 100 to 110 picks per minute, now as many as twenty looms are attended, running above 160 picks. The old fashioned carding and spinning machinery has been superseded by quicker running and productive machinery. The 250 employees formerly required to run the the old standard mill of 6000 spindles would today run three to four times as many spindles with less weekly labor.

The mills of these days were, practically uniform size, of about 150 feet, and four and five stories high, containing about 6000 spls. and 175 looms. But one of these is in existence today, and that is in the Lawrence section of the Tremont & Suffolk Mills.

The water power machinery of all the mills was old breast water wheels.

The number of mills operated in 1835 was as follows:

Locks & Canals,	1 mill.
Merrimack,	5 mills & Print Works.
Hamilton,	3 mills & Print Works.
Appleton,	2 mills.
Suffolk,	2 mills.
Tremont,	2 mills.
Lawrence,	4 mills.
Middlesex,	2 mills.

In this year there were about 5000 females and 1500 males employed. In this same year (1835) the average wages of females were $1.90 per week, and of males $4.80. 670 bales of cotton were used per week, far less, or about the same as the smallest mill now in the city. The dividends paid about this time by the mills were from 10 per cent. to 11 per cent. on the average.

TAXES IN 1826.

Merrimack Mfg. Co.,	$376 86
Hamilton Mfg. Co.,	51 42
Locks & Canals,	182 63

Kirk Boott paid the highest individual tax, viz.: $59.09.

Men's board, in the early days, at the corporation boarding houses was $1.75 per week, and board for females $1.37 1-2.

INCORPORATION AND DEVELOPMENT OF THE MILLS OF LOWELL.

To Patrick T. Jackson, Kirk Boott, Nathaniel Appleton and Francis Cabot Lowell, all honor should be due for the building and development of the manufacturing interests of Lowell. A brief history of these men, to whose memory Lowell owes much, may not at this point be out of place.

First, and undoubtedly foremost among these pioneers stood Patrick T. Jackson, born in 1780, one of the organizers of the Boston Mfg. Co. at Waltham, in 1808, who finding the water power of the Charles River at that point all taken, in connection with others, as stated before, organized and incorporated the Merrimack Mfg. Co., foreseeing the advantage the water rights of the Merrimack River would be to the future of Lowell, successfully carried out the project in his mind, and to his strong efforts, made almost single handed, Lowell owes much. Mr. Jackson lived to a ripe old age and lived to see and was instrumental in building the railroad between here and Boston, as well as many of the mills.

Kirk Boott was born in 1791, and when quite young served in the English army, finally returning to this country in 1817, and in 1822 was chosen by Mr. Jackson to serve as treasurer and agent of the Merrimack Mfg. Co. Mr. Boott died in 1837.

Francis Cabot Lowell, co-operator with Mr. Jackson in the establishment of the Boston Mfg. Co., was born in 1774 and died in 1817, but had much to do with the preliminary settlement upon the site of Lowell for a future mill centre, although he did not live to see his efforts fully realized. Our city was named after this gentleman.

Nathaniel Appleton was born in 1779. He was closely identified with Messrs. Jackson, Boott and

Lowell, in not only the establishments of the Waltham Co., but in a great measure was the first to introduce the power loom.

Paul Moody, the first agent of the Locks & Canals Machine Shop, was one of the brightest mechanics of the day, and it was due to his strong efforts that the mills of this city were so readily equipped with the most improved machinery of the times. Mr. Moody was born in 1779 and died in 1831.

Ezra Worthen, the first agent of the Merrimack Mfg. Co,, was born in 1781, and died in 1824. He, too, had been associated in the formation and operation of the Boston Mfg. Co.

Among other notable men holding positions in the early days was Warren Colburn, who followed Ezra Worthen as superintendent of the Merrimack Mfg. Co. Mr. Colburn's name will live long in the history of Lowell.

Mr. Samuel Batchelder, the first Agent of the Hamilton Mfg. Co., was a most remarkable man, foremost as a mill builder, machine constructor and mechanic. All through life he acheived success. Born in 1784 he lived 95 years, and lived to see most surprising developments.

After the death or removal otherwise of the first lot of treasurers and agents, their successors were drawn more from the legal fraternity than otherwise. We find Means of the Suffolk, Aiken and Southworth of the Lawrence, French and Childs of the Boott, all lawyers.

Of the mechanics of early days, we had W. A. Burke, Geo. Richardson and Ezra Worthen.

Of builders, Robt. Park, Nathaniel Staples and Saml. K. Hutchinson.

Of engineers, Whistler, Francis, senior and son.

Of the graduates of our mills many are found in other towns and cities occupying first positions. Lowell has had of recent years some of the most talented management that New England has produced. Three of the agents have been chosen presidents of the Cotton Mfgr's Association at various times, this association being one of the foremost in its line in the world. Two of the present agents of this city are natives thereof, a most noteworthy circumstance, as from 1822 to 1887, a period of 65 years, no man born in Lowell had ever been at the head of any of our cotton mills. Lowell has given to the country men most advanced in the line of manufacturing. There is much to think about in this, an incouragement to all, particularly the young man now employed in our mills. There is no step too

high to attain. Opportunities are continually coming up, but the trouble is to get the capable and efficient party, and here I desire to add a good word for this school, as well as for the Free Evening Drawing Schools, which the city so generously support. Opportunities are offered such as have never been before. We have here the first strictly textile school ever organized in this country, with a complement of teachers, a range of machinery possibly unrivalled in the world. Its trustees are men at the head of the various textile mills of this city and Lawrence. Its advantages are most excellent. Do we want to maintain this city as one of the centers of manufacturing? The strong competition, the natural advantages of other locations have and are today enclosing us about. Do you and I want to see a single mill of this city closed? Most certainly not, but something is to be done by you and me. We must have that pride and feel that responsibility, such as the progenitors of these mills had, that they must live and must be a success. How is this to be attained? One way let me advise. Any one of you employed in these mills, to improve yourself, come to this school and learn something about your daily work. If you are a machanic, take lessons in mechanical drawing, and fit yourself for something better than your present position. Now that you have seen this school in its operation, we extend to you all the privileges it has, to improve your mind and position, believing it to be one of the means by which the manufacturing industries of the city may be retained. Visit it often, if need be, to thoroughly understand its workings, and I think I can extend to you from the principal, Mr. Crosby, a hearty welcome. The good name and character of the city must be maintained, and the mills that were open to many of your parents, possibly grandparents, ought never to be closed, if push, hard work and a grin determination to do as well as any other business center are carried out.

I wish to close this portion of the lecture by quoting to you a few words from a paper by E. Atkinson, written some years since, but so applicable today that I venture to transgress on your time to read it. Mr. Atkinson says in part, in relation to competition with other countries:

"In respect to the Eastern States, the cotton factories of Lowell, Mass., Manchester, N. H., Biddeford and Lewiston, Me., may be considered in their relation to the factories of Manchester, Stockport,

Preston and Bolton in England. For the purposes of this comparison it may be assumed that there can be no permanent advantage of one set of mills over the other in respect to the quality and perfection of the machinery. At any other time, some advantage may be claimed and admitted on either side, in some special department of the mill, but every invention or improvement will sooner or later be adopted on both sides.

The best conditions of life for the operatives, and the best prospects of improving their condition and that of their children, are of the gravest importance. The factors in this problem are education, shelter, subsistence and opportunity for other kinds of work. In respect to education, the common school system of the United States assures a thorough training, free of cost, and in the principal towns and cities free education is carried to the point of preparing the pupil to enter a university.

In comparing our power to compete with England we may claim advantages of one kind, and with the nations of continental Europe advantages of another, in some respects of a different order. In competition with England it is often claimed that our chie advantage lies in a certain alleged versatility and power of adapting means to ends, and in great quickness of perception on the part of working people in respect to the advantages to be gained by the adoption of new processes or inventions. If we have this advantage there must be special causes for it in the influences that are brought to bear upon the operatives and artisans who do the work, for a very large proportion of them are foreign-born or are the children of foreign emmigrants. Why should they work with any more zeal or judgment here than in the countries whence they have come? Why are Irish and French Canadian factory hands to be relied on for more steady work, larger products, better discipline and more cleanly and wholesome conditions of life than the operatives of England, Belgium and Germany? It appears evident that these advantages, so far as they exist, are due mainly to the following circumstances:

1st. Our system of common and purely secular schools, attended by the children of rich and poor alike.

2d. Manhood suffrage.

3d. The easy acquisition of land.

4th. The habit of saving small sums induced by the establishment of savings banks throughout the manufacturing states.

5th. The absence of a standing army and the application of the revenue derived from taxes on the whole to useful purposes.

In respect to the first of these influences, the public school system, the foreign observer generally takes notice only of the quality of the instruction given, and though he may find something to praise he finds also much to blame; he finds in many cases the instruction bad, and the subjects often ill-chosen, and he wonders at the misdirection of a force that might be so much more wisely applied. What he fails to notice is that the school itself, entirely apart from its instruction, is the great educator of the children who attend it. The school is, first of all, no respector of persons. The stupid son of a rich man, led in every class by the son of a mechanic, cannot in after life look down on him as an inferior, whatever the conventional position of the two men be; or, if the rich man's son have brains as well as fortune, the poor man's son can never attribute to fortune only the lead that he may take in after life. The school is thoroughly democratic, and each pupil learns in it that it depends on himself alone what place he may take in after life; and that although society may be divided into planes, there is no system of caste, and no barrier in the way of social success, except the want of character and ability to attain it. The associations of the common school utterly prevent anything like servility in the relation of classes in after life; and although it is sometimes made a little too manifest that "one man's as good as another and a little better" on the part of those who are more eagar than discreet in their efforts to rise, yet, on the whole, the relation of the various classes, which must in the nature of things always and everywhere exist, is that of mutual respect, and anything like the Old World distinctions of caste and rank would seem about as absurd to one as to the other. The common school is the solvent of race, creed, nationality and condition.

The instruction of the school also gives every pupil superficial knowledge, if no more, of the geography and resources of the country, which the universal habit of reading the newspapers keeps up. Hence comes the almost entire absence of any fixed character in the labor of the country; every boy believes that he can achieve success somewhere else, if not at home. No congestion of labor can last long. The war and the succeeding railway mania combined concentrated population at certain points to a greater extent than ever

happened before, and it has taken five years to overcome the difficulty; but within these five years a million new inhabitants in Texas, half a million in Kansas, and probably a million and a half added to the population of Nebraska, Colorado, Minnesota and the far northwest, indicate that the evil has already found a remedy.

During the last thirty years the factory population of New England has passed through three phases. First came the sons and daughters of the New England farmers, but as the sewing-machine and other inventions opened new demands for women's work, women of American birth passed out to easier and better paid employments, while the men took up other branches requiring more individual skill. Their places were taken mainly by Irish, with a few Germans and English. But as the Irish saved their earnings, and as the New England yeomen emigrated to the richer lands of the great West, they passed out of the mills to buy up the deserted farms of the poorer northeastern states, where, by their persistent industry and manual labor, they achieve success and gain a position which satisfies them, but with which the native New Englander is no longer contented. Their places in the mills are now being more and more taken by the French Canadians, who, in their new conditions and surroundings show little of the stolid and unprogressive character which has kept them so long contented on their little strips of land on the St. Lawrence River. In the very air they breath they seem to imbibe a new and restless energy, while the intelligence shown by their children in the schools augurs well for their future progress.

From the foregoing, which I trust has been instructive and possibly of benefit to you all, I hope that the best welfare of the future of your city may be advanced so far as is possible by each and every one present. We don't want to see Lowell a dead city. It should stand at the front as it has for many years, and the kindly spirit shown between the employer and employee that has existed for years should be continued.

Thanking you for your kind attention, I must close.

The depth of the Atlantic Ocean between the Canary Islands and the West Indies is tremendous. A pretty level bottom runs from the African islands to the American ones, gradually deepening to 19,000 feet. At this spot might be sunk the highest peak of the Alps and have nearly half a mile of sea-water covering it.

WHO IS THE MOST POPULAR OVERSEER???

The voting is progressing quietly and smoothly. There are several overseers who do not wish their names to be connected with a voting contest.

This is certainly not a money-making affair. The Lowell Textile Journal has been published regularly from the first number of volume No 2, but it has not been a profitable venture. The students were discouraged, so the management decided to offer a reliable and standard tandem wheel to be voted for, in order to circulate the Textile Journal among the mill help. So far the undertaking is very encouraging, the number of advertisers has been more than doubled, the circulation has gone up three hundred per cent.

We wish to make the Journal a mill paper. The reading matter will continue to be selected from the very best sources and authorities.

It is our wish that the mill people should have a journal where they can write and ask questions; these to be answered by their associates. Such a paper would find a place among the hundreds of thousands of mill help in New England.

We earnestly ask you to become associate editors. Send the news of the daily occurrences in and around your mill. Such news is always welcome and makes interesting reading.

The names of the overseers who have received votes stand on the list in the following order:

John H. Wadsworth, Arlington Mills, Lawrence.
T. B. Stevenson, Merrimack Cotton Mills, Lowell.
James F. Walker, Lowell Mfg. Co., Lowell.
Urias Hardy, Arlington Mills, Lawrence.
Charles Bragg, Tremont & Suffolk Co., Lowell.
Samuel Jepson, Pacific Mills, Lawrence.
James Ingraham, Washington Mills, Lawrence.
Thomas Amiss, Rankin Building, Loom Fixers' Association, Lawrence.

That was a great feast the Southern Cotton Manufacturers enjoyed at their convention at Charlotte, N. C., on May 11. The report says: "Social joys and conviviality flowed freely." Why should they not? The banquet was made up of flowing liquids. On the Souvenier Menu we read: "Cocktails, Claret, Sherry and Mumm's Extra Day."

Our Southern brether'n do not believe in total abstinence.

Lowell Cotton manufacturers live in a prohibition city where such a flow of joy and conviviality could not be had, "Uno."

. . .

Send in your subscription.

THE LOWELL TEXTILE JOURNAL.

A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager.

PUBLISHED MONTHLY

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No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid 50c.
Single Copies 5c.
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the fifteenth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

If you are not a subscriber and have been receiving copies of the Lowell Textile Journal from time to time they have been sent you with the thought that upon examination of our publication you would favor us with your subscription—"only fifty cents a year," which we now invite you to do.

As the Journal is only a "school paper" should not deter you from being a subscriber. We intend the Lowell Textile Journal to be one of the leading papers on all matters connected with technical education. We must have your assistance to carry out the work. We ask for your help. Send your name in as a subscriber. Sign the slip on page 35 and send to us.

Attend to this matter now and you will receive your copy regularly hereafter. Figure it out; the cost is less than one cent per week.

. . .

The first graduation exercises in the Lowell Textile School will take place on the 2d of this month.

. . .

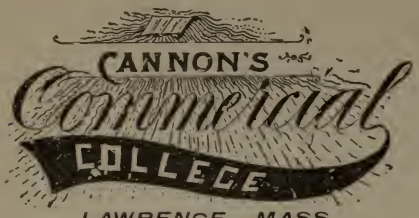
It is little over a year ago when Sam Stewart wrote on the blackboard: "Dew we (Dewey) love a hero?" Sam was boiling with enthusiasm when he wrote those words. He had an inspiration. Boys, do we love a hero! Admiral Dewey starts for his much beloved country this month. He has nobly done his part, but at the sacrifice of his health. Our soldiers and navy have all done their part in a noble and heroic manner. They are all heroes and we love them all.

. . .

A Textile School equipped with the finest machinery is a benefit to all. Any city should be proud of an institution equipped like the Lowell school.

. . .

We beg to thank every student and instructor who has kindly assisted in making the Journal a success as a school paper.



Mr. Cannon has just placed Miss Ethel Litch in the office of the great U. S. Worsted Co. of N. Y., as stenographer and typewriter. She studied with us evenings, working in the cloth room of the Washington Mills during the day.

We can do as well for *you*. Write us.

The cotton spinners are in favor of the city granting the $7,000 appropriation.

. . .

Give the Textile Unions a place for a member on the board of trustees.

. . .

At the Telephone—(A fact.)

Mill in Lawrence: Hello! What's that?

Office in Boston: Have you a sample of that worsted yarn I was speaking about?

Mill in Lawrence: What yarn? (Holding a sample up to 'phone) Is this it?

Office in Boston: Gol darn! Just like that d——d phool in Lawrence. He thinks we can see a sample of yarn through the 'phone.

. . .

It is our sincere hope that ere this is in print the City of Lowell will have granted the appropriation.

If those who cannot afford to spend five cents on the Journal will hand their names into this office we will send them one free. The students say it looks bad for one department to send to another department to borrow the Journal when the cost is only five cents.

. . .

During vacation we shall be glad to receive any items of interest from *you*.

. . .

The proposed "scholarships" have created a keener interest in the Textile School.

. . .

If the rank and file will inspect the school, then they can talk with knowledge. Otherwise it is all wind and bluster.

. . .

The examinations and extra studies must have interfered with the base ball games.

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MANUFACTURING - STATIONERS,
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SIMPLE LESSONS IN PHOTOGRAPHY.

Plain Paper Silver Printing.

While there's a great charm in a photographic print having a surface as smooth and glossy as glass itself, yet equally so is there a peculiar beauty in one totally devoid of all glaze.

It will have been inferred from the previous article that silver printing may be effected on plain or non-albumenized paper quite as well as on that which has been albumenized. Many excellent photographs have been made upon ordinary writing paper. If any reader thinks of trying his hand at such a modification he must select a smooth, hard-sized, wove, not laid, sample of paper.

This is to be salted by sponging or brushing it over with a solution of chloride of sodium (common salt), six grains to the ounce of water, and then suspending it to dry. But a much richer effect is obtained by the addition of three grains of gelatine, which imparts vigor to the print by keeping it more on the surface without giving it a glaze like albumen. Instead of brushing the albumen over it is much better to pour it into a flat dish and allow the paper to float on it for a minute. When dry it will remain good for a long time.

To sensitize the paper float it for two minutes upon a bath of ammonia — nitrate of silver, made by dissolving fifty grains of nitrate of silver in an ounce of water (or in a larger quantity, adopting the same proportion), and then adding to it strong ammonia drop by drop. The effect of this addition is to cause a dirty-looking dark brown precipitate to be formed in the previously clear liquid, and the ammonia must be slowly added until indications appear that the liquid

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is beginning to become clear. Now stop and shake or stir the solution to mix the ammonia with it, when if not yet clear add more, but only by a single drop at a time, followed by stirring or shaking after each drop. Cease adding ammonia after the solution has become almost clear, for it is better that this stage be not quite reached than there be an excess of ammonia. If the mark should have been overshot a little more solution of nitrate of silver must be added.

This solution when filtered forms an exciting or "sensitizing" solution for plain paper, which yields prints of great beauty of tone. It is not so well suited for albumenized paper. But for plain salted paper, while the above-described ammonia-nitrate of silver bath is undoubtedly the best, yet will a plain nitrate of silver solution also answer well although, so far as our experience goes, it will not give such rich, deep chocolate blacks as the other.

The paper, having been dried, is ready for exposure in the manner already described.

Concerning the toning and fixing, this either may be done in the way mentioned in a previous chapter, or, to save trouble, both these operations may be merged into one. To this end the printing should be carried on until the image is nearly veiled in obscurity and the pictures, after being rinsed in plain water, immersed in a bath prepared according to the following directions:

In four ounces of water dissolve one ounce of hyposulphite of soda, fifty grains of sulphocyanide of ammonioum and thirty grains of phosphate of soda. After these have been dissolved add to the solution two grains of chloride of gold previously dissolved in a little (say two or three drachms) water.

The toning and fixing go on simultaneously, and the prints are allowed to remain in this until they have acquired a very rich black

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tone, by which time the effect of the over-printing will have been obviated by a corresponding reduction.

After removal from the toning and fixing bath the prints must be well washed.

The solution will remain good for a considerable period by strengthening it occasionally with a few drops of gold solution, and the addition of fresh hyposulphite of soda. When it is considered to be quite used up by long keeping or frequent use it may be poured into a convenient bottle of large dimensions or jar in which other waste hyposulphite solutions are kept, for at least two-thirds of the silver employed in the sensitizing of the paper can be recovered, thus reducing to a material extent the expenses incurred in riding the photographic hobby.

What has here been said about the saving of the waste hyposulphite of soda from fixing prints applies with equal force to that employed in the fixing of negatives.

INSTRUCTIVE AND PLEASANT EXCURSIONS.

Twenty of the students in the department of Woolen and Worsted Spinning, in charge of Prof. Barker, visited the famous Talbot Mills in North Billerica on Wednesday, April 12th, through the courtesy of Agent F. S. Clark, who is one of the directors of the Textile School.

Superintendent Joseph Talbot personally conducted the party through the mills and they were given opportunity to see every detail, from the raw wool to the finished product.

The mills are running at their fullest capacity and turn out a fine line of light weight ladies' woolen dress goods, tricots, carriage lin-

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ings, flannels, thibets and army cloths.

The engine house containing the famous 500 H. P. engine "Governor Talbot," designed and built for these mills by the Corliss Engine Works, attracted much attention. This engine is built and runs literally "like a watch."

The new dye house and boiler house now under construction are masterpieces in their lines, and the entire plant is in every way a model "up-to-date mill."

On Wednesday, April 12th, the cotton classes under Prof. Hedrick, visited the Lowell Bleachery. This was through the courtesy of the agent, Mr. Frederick A. Walsh. On arriving at the the mill the students were shown through by the superintendent, Mr. Monaghan, who explained every step in the process of bleaching and dyeing of cotton cloth. The method of filtering the water used by the mill was of special interest.

One could obtain some idea of the great responsibility involved in the process of bleaching cotton goods. Although the time was necessarily short for such an inspection, the explanations were to the point, condensed, interesting and understandable. Such excursions are instructive and should be of great benefit to the students.

A TOUR OF INSPECTION.

On Thursday afternoon the cotton men had the pleasure of visiting the establishment of Robert Carruthers Co., manufacturers of loom reeds, harnesses, etc., and this "special feature" of the term's work, arranged by the principal of the school, through the courtesy of Mr. Carruthers, was thoroughly enjoyed by all the boys who participated in the excursion.

The party being in charge of

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Prof. Hedrick and Inspector McDermot, nothing was left undone that could be done for the systematic tour of inspection to make it a success in every way. The machinery used in the manufacture of these reeds, etc., is most interesting, and involves some of the most important fundamental principles of mechanism, among them being the "Epicycle Train," used in winding the tarred binding cord, the cam wire-feed, which regulates the length of wire inserted, and the train of grass, like a lathe train, which determines the number of reeds or wires per inch. The machine takes the wood strips, coil of wire and spool of binding cord, and combining them by carefully adjusted and well regulated mechanical devices, produces a perfect article that is ready, with a few finishing touches, for the market for which it is destined. A perfect reed is a most important factor in the manufacture and production of perfect cloth. The whole process through which it passes is most interesting, and the needed points in its manufacture have been found out by years of practical experience and experiment.

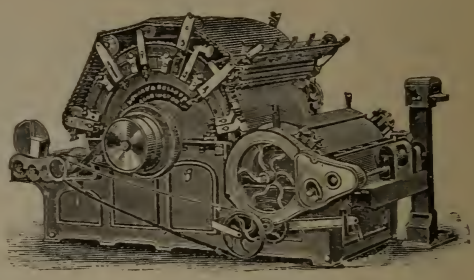
Winding on the tarred cord kept soft and pliable by heat from a gas jet, which is in the path of the spool, and the "setting" of the reeds while they are still warm, these and many more points necessary for the production of perfect goods are a part of the trade and all can not be known except through an apprenticeship, and faithful work, too, till the trade is learned. The machines for reducing the wire to required size and width were placed on "file" for the "scrape" they were onto.

We thank Mr. Carruthers and his men for their extended courtesy, and hope to visit his interesting establishment again. Take us out again, Professor, it's all right. W.

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SCHOOL ECHOES.

Mr. Taplin had a finger injured by getting it caught between the bottom-roll gear and pawl in the take-up motion of the Crompton Ingrain Carpet Loom. A cotter pin was driven through the finger, and the forward advance of the gear tore off the finger-nail.

An old author once wrote: "Avoid argument with ladies. In spinning yarns among silks and satins a man is sure to be worsted and twisted. And when a man is worsted and twisted he may consider himself wound up.

I say, Fitchburg, do teazles grow on a sheep's back?

The second team would like to arrange a game with the first base ball teams. Taps, manager.

You cannot play on my nine.

Cast your votes now.

James F. Walker of the Lowell Manufacturing Company is the most popular overseer with the evening students. Mr. Walker was a student in the textile design class.

The Sub-Editor says — "I'll never tell."

Tap's "accident" did not cool his ardor for the fair spoolers.

Although painful, sometimes it is convenient to have a sore on the arm, especially when it is required to be shown to the umpire to prove that a player has been hit with the ball.

Old sores don't go with young players, Joe. Show a new one next time.

We would say to the person who sent a school item that was not clean or moral — Don't do it again; you will hear more about it. Take note: "He that is most abusive to others lies most open to it himself."

Picked up in the Art Studio:

Here try four young ladies Textile
The grave passer-by to beguile;
But their efforts don't show
As they sit in a row,
For their hands are too much for the smile.

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THE VALUE OF ISOCHROMATIC PLATES.

Mr. G. Cramer, the well-known plate maker of America, puts the isochromatic question very clearly, thus:

"Let us imagine a landscape before us; on the horizon the distant hills; in the foreground, foliage in the beautiful shades of autumn. The ordinary plate would take the sky white, being just as sensitive to the light blue as to white rays; and, therefore, will show no clouds unless they are of a darker shade. The distant hills would only be faintly visible, and the foliage be lacking in detail. The orthochromatic plates would give us a soft, gray sky, not white, but with beautiful white clouds; the distant hills just as distinct as you see them in reality, and the foliage, with all the various gradations, from the finest high light to the deepest shadows, every leaf being clearly detailed, and every blade of grass standing out from the rest. In all it gives us just what we see with our own eyes, except the colors. For portraits, we consider we have to photograph a pretty, rosy-cheeked girl from the country — rosy-cheeked, but a little freckled, with a blue dress and yellow trimmings, and with auburn hair. The ordinary plate will give her a fair face, but what a job to retouch all the freckles! The blue dress will appear like a light one, the yellow trimmings will be too dark. Her hair will show a great lack of detail, and appear the same as black hair; while the other plate will give, if anything, a bolder, rounder image. Freckles will not be visible to a greater extent than you can see them with your eyes, and, in the portrait, are generally smaller than

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the original, as they are almost entirely invisible. The hair will be of a medium shade, and as full of detail as that of a brunette. The dress will be of a proper tone, the yellow trimmings in harmony with the rest."

NOTE ON IMPROVING THE COLOR OF RAW JUTE.

In a new process due to a Scotch inventor, the jute fibre is sprinkled or sprayed with phosphoric acid which has been diluted with water to the required extent. The sprinkling or spraying may be done while the jute is being batched or while it is being passed through the softening machine or the carding machine, or otherwise as is most convenient. The phosphoric acid used may be in the ordinary commercial form—that is to say, carried in an agent, such as mineral shale oil. The phosphoric acid may be of 50 per cent. strength—that is to say, 50 per cent. acid and 50 per cent. carrying agent, and this may be used in the proportion of 1 part (by weight) to 250 parts (by weight) of water. The weight of the dilution required for a 400 pound bale of jute is approximately 64 pounds, say 4 ounces (by weight) acid and carrying agent added to 64 pounds (by weight) of water.—*Textile Manufacturer.*

ATMOSPHERE.

Everyone carries an atmosphere about him. It may be healthful and invigorating, or it may be unwholesome and depressing. It may make a little spot of the world a sweeter, better, safer place to live in, or it may make it harder for those to live worthily and beautifully who dwell within its circle.—*J. R. Miller, D.D.*

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A VERY CLEVER TRICK.

The clever trick with billiard balls. A number of billiard balls are placed in a row against the cushion of the table. The player asks one of the spectators to name a certain number of balls to be pocketed without any apparent disturbance of the others. Suppose the number be three. Then at the will of the player three balls separate from the others and roll into the pocket. The number is perfectly controllable, and when the hand of the player and one end of the row of balls is covered, the trick appears mysterious. It is hardly less so when the entire experiment is visible. The feat is accomplished by removing from one end of the series as many balls as are to be projected from the opposite end, and rolling them forward against the end of the row remaining. An equal number of balls fly off from the opposite end of the row and roll into the pocket. Three balls driven against one end of the series will cause three to roll off, two will drive off two, one will drive off one, and so on.

The principle of this trick is illustrated in the well known class-room experiment in which a series of contacting suspended balls of highly elastic material are made to transmit a blow delivered on the first of the series to the last ball of the series, so that the last ball will fly off without any apparent disturbance of the other balls. In this experiment, the first ball of the series is drawn back and allowed to fall against the first one of those remaining in contact. The impact of this ball will slightly flatten the ball with which it comes in contact, and each ball in turn transmits its momentum to the next, and so on through the entire series, the last

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of the series being thrown out as indicated.

In the case of the experiment with the billiard balls it is found by careful observation that separate blows are given to the series, corresponding in number to the number of balls removed, so that while the separation of the three balls at the end of the series is apparently simultaneous, in reality they are separated off one at a time.

SZCZEPANIK.

According to the correspondent of The Daily Chronicle, the irrepressible Szczepanik, the young inventor, has presented the Emperor Francis Josef with the first web produced by means of his photographic process. It is about two meters square and gives an allegorical representation of homage to the Emperor. It is said the work contains 200,000,000 crossings, 120 silk threads filling one centimeter. Two hundred square meters of pasteboard cards would have been necessary to produce this web according to the methods now in vogue, and designers would have required many years to have carried out the work. It is said the work was done in five hours. Unfortunately, all of Herr Szczpanik's inventions are shrouded in mystery. However, at the coming World's Fair he promises to unbosom himself, and we shall probably have to wait until that time for explicit details of his inventions.

NOT MUCH TO MAKE UP.

Husband — Well, can't you decide? It never takes me more than a minute to make up my mind.

Wife — I'm not surprised, my dear; it should n't take any one more than a minute to make up your mind.

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THAT faulty piece of philosophy, "Keep a thing seven years, and you are sure to find use for it," should be amended, and some longer period fixed during which to keep that which our discernment warns us is worthy to treasure. Take for example the long ostrich feather, that appear once more on all up-to-date headgear. I cannot remember the exact year in which it last poised itself round the hat of the period, but I am ready to assert it is nearer seventeen than seven years ago. But *what* to keep is the matter for fine discrimination. How to distinguish between the thing of passing value, and that of permanent. Perhaps feathers, furs and lace, are almost the only items of which one may be absolutely certain that they should be stowed away. About the keeping of gowns, there are hardly two opinions in the minds of the sensible.

A SCIENTIFIC GRANDPAPA.

"See, grandpa, my flower," she cried;
"I found it in the grasses!"
And with a kindly smile the sage
Surveyed it through his glasses.

"Ah, yes," he said, "involucrate
And all the florets ligulate.
Corolia gamopetalous,
Compositae, exogenous—
A pretty specimen it is,
Taraxacum dens-leonis!"

She took the blossom back again,
His face her wistful eye on;
"I thought," she said, with quivering lip,
"It was a dandelion!"

—*Margaret Johnson in St. Nicholas.*

FEBRUARY, 1866, was in one way the most wonderful month in the world's history. It had no full moon. January had two full moons, and so had March, but February had none. This remarkable state of things had never happened before, since the area we assign to the Creation.

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A. White,

Designer and Builder of Experimental Machinery.

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A QUESTION SETTLED IN POETRY.

The following has been raked up from the ashes of the past by a contemporary. It was written on the morning of Jan 1, 1801.

Precisely at twelve o'clock last night
The eighteenth century took its flight;
Full many an acking head
Has raked its brain, its ink is shed
To prove by metaphysios fine.
That one hundred means but ninety-nine.
While others at such wisdom wondered,
But took one more to make a hundred.

We beg all "acking heads" that have puzzled over this subject to commit these lines to memory and remember that it takes 100 years to make a century.—*St. Paul Press.*

PLANT TREES.

What do we plant when we plant the tree?
We plant the ship which will cross the sea;
We plant the masts to carry the sails,
We plant the plank to withstand the gales,
The keel, the keelson and beem and knee;
We plant the ship when we plant the tree.

What do we plant when we plant the tree?
We plant the houses for you and me;
We plant the rafters, the shingles, the floors,
We plant the studding, the laths, the doors,
The beams, the siding, all parts that be;
We plant the house when we plant the tree.

What do we plant when pe plant the tree?
A thousand things that we daily see;
We plant the spire that out-towers the crag,
We plant the staff for our country's flag,
We plant the shade, from the hot sun free;
We plant all these when we plant the tree.

Henry Abbey.

"If I go ter school ter day de teacher 'll lick me fer not preparing my lesson, an' if I stay at home me mudder 'll lick me fer not goin' ter school. Now, either I got ter go or stay home. But if I go an' teacher licks me an' mudder finds it out, me mudder 'll lick me fer not doin' my school work; an' if I stay home, and me mudder licks me, de teacher 'll lick me termorrow fer bein' a truant! Gee! Guess I'll go ter sleep!"

A. G. HILL,
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Lowell Textile Journal.

GRADUATION EXERCISES, LOWELL TEXTILE SCHOOL.

On Friday evening, June 3, 1899, at the Lowell Textile School, the first class graduated out of the first Textile School in New England. The list of day students who were graduated and received diplomas, includes six young men and one young woman. Miss Katherine Burrage, Lowell, Mass., art and textile design; Jas. W. Bailey, Waltham, Mass., cotton manufacture; Chas. T. Harmon, Lowell, Mass, cotton manufacture; Albert A. Smith, Lowell, Mass., cotton manufacture; James H. Cuttle, Lowell, Mass., woolen and worsted manufacture; Augustus B. Fels, Dracut, Mass., woolen and worsted manufacture; E. T. Tilton, Lowell, Mass., woolen and worsted manufacture.

The list of evening students who received certificates, number 18 in the departments of design, textile design, weaving, cotton spinning, woolen and worsted spinning:

Jas. T. Broadbent, Lowell, cotton spinning; Heaton Binns, Lowell, woolen and worsted spinning; H. H. Crompton, Methuen, woolen and worsted spinning; J. Kellett, Lawrence, woolen and worsted spinning; J. D. Manjevison, Lawrence, woolen and worsted spinning; T. A. Nugent, Lowell, woolen and worsted spinning; W. H. Stopherd, Lowell, woolen and worsted spinning; W. H. Stevenson, North Billerica, woolen and worsted spinning; Healon Bemis, Lowell, weaving; J. T. Noble, weaving; W. H. Stopherd, Lowell, weaving; E. S. Smith, Lowell, weaving; T. A. Nugent, Lowell, weaving; J. W. McAllister, Lowell, weaving; Frank M. Berry, Lowell, textile design; A. C. Gaunt, Methuen, textile design; A. L. Moir, Lowell, textile design; E. H. Spedding, Lowell, textile design; W. Wilmot, Lowell, textile design; G. H. Wilton, North Andover, textile design; John Collier, Dracut, textile design.

The exercises were held in the lecture hall, and were opened with



W. H STOPHERD, WM STEVENSON. HEATON BINNS, T. A. NUGENT. IRVINE KELLETT,
H. H CROMPTON, E. H. BARKER, J D. MARGERISON.
Prof. of Woolen and Worsted Spinning.

music by a band. The platform was attractively decorated with palms. The president of the board of directors, Mr. A. G. Cumnock, made a brief speech of welcome to the large audience, friends of the graduates and of the school. He then introduced Mr. Thomas Walsh, superintendent of the Hamilton print works, who said in part: "There was a time when the secrets of manufacturing were kept safely locked away from inquirers, but now we have books in which everything pertaining to the business is taught. The art of manufacture is growing fast into a science, and it requires men who are educated to understand it. If the citizens of Lowell could comprehend the immense value of a textile school, there would not be room here for anybody to get in when the school is in session.

"Whatever you undertake to do, do it as well as you can, using all the information you have got. Another thing: Never weigh what you are doing, by the compensation that you get. Progress depends upon what a man does, not upon what he is paid. There never was a time when there were so many opportunities for educated manufacturers as there are today."

Mayor Crowley was the next speaker, and he told of the days when he was a mill boy, on the Lawrence corporation. "I arose to the dignity and high position of a spare hand," he said, "and from that I went to run an old-fashioned first picker. I had a man running a second picker, and I was the boss. I felt the dignity of that position, too. I also learned the trade of a machinist, and worked in the machine shop until the breaking out of the war. After the war, unfortunately for me, I went into a lawyer's office, and stayed there until elected mayor."

"There was not much chance for a boy to rise in those days, in a cotton factory. He did not get the chance to be a skilled mill hand that this school gives him. As I looked upon this school, it seemed to me that I never saw cotton machinery before, it has changed so much since my day.

"I have heard it said outside, that this is a school only for the rich man's son. That is a mistake. It is a school for the poor man's son, if the poor man's son will take advantage of it. There is no royal road to either fame or riches.

"I am sorry to see an impression in the community that the textile school is a device of the corporation agents, for the purpose of grinding down the poor laborer. The trouble is that a vast majority of the people working in the mills get a notion that if a man is a mill

agent or a mill overseer, he is bound to persecute the laboring man. They are taught so by the labor agitator. There should be no quarrel between capital and labor. They should go hand in hand for the welfare of each other and of the community in which they exist."

Contrasting the qualifications of the early mill agents, with those of the present day, the mayor said: "They were good lawyers, or members of the first families of Massachusetts, desended from the first families of Virginia. But the agents that we have today, and it accounts for the prosperity of the mills of these days of close competition, are men, who, if I am correctly informed, rose up from the ranks of the laborers.

"Young men, from this night on you will be wondering what is to be your prize. A great deal lies in your own hands. In the years to come you will look back with pleasure to this school, and I hope that sometime in the future I will meet you as principals of textile schools, or as mill agents, and you will remind me of the few words I spoke to you one night."

Mr. J. L. Chalifoux spoke from the standpoint of the merchant. "Personally," he said, "I cannot see how any Lowell citizen can be indifferent to the welfare of the Lowell Textile School. We have two sets of people in the city who speak disrespectfully of this noble institution. First there are the men who are not willing to take the trouble to look into the merits of any institution that is new. Next, we have a certain class of politicians who make a point, whenever there are appropriations called for, for such work, to create opposition. I was surprised when I read that our city council called for a special meeting, before appropriating the paltry sum of $7,000. From the time of Galileo to the present, we have had men who would not progress.

"I know personally in my business, that there is annually a scarcity of choice designs, and the manufacturers who have capable assistants are enabled to keep their factories in operation permanently. The citizens of Lowell should unite to disarm this unfair and unjust criticism."

Agent E. W. Thomas of the Tremont and Suffolk mills spoke of the improved facilites for manufacturing, both in machinery and in skilled workmanship. "The Lowell Textile school," he said, "is the most perfected school of its type to be found in the world. The board of trustees feel that in this school are being sown the seeds that will in the near future

prove the salvation and permanency of manufacturing in the north. The mill manager is handicapped by the difficulty in obtaining the right kind of skilled workmen. We hope that the school will obviate this difficulty. As one of the trustees of this school, I personally wish you success. I think you will find the manufacturing world will give you a hearty welcome."

Before presenting the diplomas, President Cumnock said: "When we appeared before the Legislature asking for an appropriation to organize this school, Senator Roe of Worcester, said he would not vote a dollar unless we agreed to open its doors to women. I am glad to say tonight that one of the graduates of the school of design is a woman, one of our Lowell girls. This school is open to all women of Lowell, and you will have the same opportunities that the boys have. There is a variety of trades a woman can enter, besides typewriting, if they will come to this school."

Each student as his name was called, received his diploma, neatly tied with the school colors, crimson and black. Three of the students, Messrs. Binns, Stopherd and Nugent, were gratuated from the woolen and worsted spinning and from the weaving department, receiving two diplomas.

Mr. Cumnock stated that three of the class have attended the school four evenings a week, after their day's work never missing a night.

Mr. A. B. Fels, for the graduating class, expressed thanks to the trustees and to the faculty, for the opportunities given and the treatment received at the school.

The principal, Mr. Crosby, briefly expressed his appreciation of the co-operation of the trustees, the members of the faculty and the pupils, and bespoke a continuance of the same from the pupils who remain.

The secretary, Mr. J. T. Smith, spoke of the bright prospects in the manufacturing world, and said a good word for the art department of the school, which is his especial pet.

President Cumnock showed a finished garment, the yarn for which was spun in the school, and the garment entirely finished by one of the students, in the Pickering knitting mills. He invited the inspection of the visitors. "I think," he said, "that we have the best equipped school, so far as machinery is concerned, that there is in the world."

During the afternoon, a large number of visitors saw the exhibition of work in the various departments, by the pupils, and the ex-

hibition will be open to the public until 6 o'clock this evening. Many new features have been introduced and new pieces of machinery procured, within the last year, and most of the departments are now excellently equipped, though more room is needed for the department of chemistry and dyeing.

In the first room, under the instruction of Mr. Vesper L. George, is taught the rule of historic ornament, the harmony of colors and principles of decorative art. In this room are shown many artistic and original designs for wall paper, which branch is developing to an unexpected extent, the young women students being particularly attracted to it.

Passing from this room, the pupils are put under the tutelage of Mr. Fenwick Umpleby, where they are taught the practical application, to textile fabrics, of the art principles learned under Mr. George. There are some fine exhibits of textile fabrics, designed and woven by the pupils, in cotton, woolen and carpet weaving. This department is the foundation of the whole textile school work, and the course requires three years. Being the cornerstone of the whole structure of textile education, this course is obligatory, and with it the students can take one or more of the other courses, comprising cotton, woolen and worsted spinning, weaving, dyeing, etc.

In addition, there has recently been introduced new features, including studies in the German and Spanish languages, as there is a demand for instruction in the art of marketing goods, as well as in designing and manufacturing. A good knowledge of commercial methods, and ability to become familiar with the German works relating to that department of the textile business, is becoming more and more essential, and the probability of a wider market for our textile goods in the Spanish speaking countries, makes a knowledge of that language advantageous.

Also, in the art department, several specialties are developing, although textile design is the chief aim, with a view to raising the standard of American manufacturers. Interior decoration is attracting the young women students, but they are by no means neglecting the regular course in textile design.

The cotton department, under direction of Mr. C. C. Hedrick, shows the process of cotton spinning, from the first preparation of the cotton, as it comes from the field, with the seeds in it.

A side feature in this department is a new cotton combing process, by which the fine sea-island

or long-fabre cotton is straightened, to be manufactured into the goods with that fine silky surface, under which description comes the fabric known as "nearsilk," It is a little out of the regular line of cotton manufacture, but is coming into general use the same as worsted fabrics, for which the woolen fibre goes through the same sort of straightening process, with far more elaborate machinery.

In the woolen and worsted department, Mr. E. H. Barker is the superintendent, and he has a line of machinery in which he feels special pride, and justly so. The worsted machinery is all new this year, and is complete throughout the various processes. Separate motors are used here for the combing department and the worsted and woolen machines. In a side room is one of the most complete outfits for weighing and testing the strength and twist of the yarn, in the world. Yarn is made here for the Talbot and Stirling mills, and others, and in the worsted department, tops are made for the U. S. Bunting company.

In the weaving department there are 22 varieties of power looms, from those weaving plain cloths to the most elaborate cotton fabrics including fancy ginghams, lenos, towelling, lappetts, etc.; there are woolen looms for dress goods, flannels, men's wear, overcoatings and blankets, and there are carpet looms weaving ingrain carpets. The weaving department is under the direction of Mr. Will Nelson.

The department of chemistry and dyeing is under the direction of Prof. Louis A. Olney, A. C., formerly of Brown and Lehigh universities. In this room one might spend an hour, with profit and interest. It was found that without a thorough knowledge of chemistry a practical knowledge of dyeing was impossible, therefore this department has grown to be one of the most important features in the school.

The principal of the school, William W. Crosby, is a graduate of the Massachusetts Institute of Technology, and was formerly an instructor there also.

NOT CAUGHT.

Miss Oldgirl (coyly) — I had a strange dream the other night, Mr. Junior. I dreamed — only think — that you and I were married and on our honeymoon. You don't know how real it seemed. Did you ever dream such a thing?

Mr. Junior (firmly) —No, Miss Oldgirl, I did not. In fact, I haven't had the nightmare for a good many years.

SIMPLE LESSONS IN PHOTOGRAPHY.

PLATINUM PRINTING.

Both on the score of artistic results as well as on those of simplicity and permanency, the platinum printing processes enjoy immense favor, and the beginner will do well to make himself acquainted with them so soon as he has mastered the methods hereinbefore described.

The original platinum process itself is now to be described, not necessarily in full detail, but sufficiently so to enable its principle of action to be clearly understood.

Paper is washed with a mixture of ferric oxalate and potassic platinous chloride, made by dissolving sixty grains of the platinum salt in one ounce of the iron solution.

In printing, which is done in a frame in the same manner as albumenized paper, if the atmosphere be quite dry no precaution is required; but, if moist, then is it desirable to superimpose a sheet of thin india-rubber cloth on the paper to protect it from the action of the atmosphere during printing.

A rather faint image is produced by exposure to light, arising from the ferric being reduced to the ferrous oxalate, of which this visible image is composed. Although the proof is but feeble, yet it is of a nature sufficiently pronounced to enable a decision being arrived at relative to the progress of the printing. When done the print must be again transferred to a dry place until all the printing is done, when the proofs undergo the next preparation, the nature of which we will explain by a little recapitulation. On the print we have got both ferric and ferrous oxalate in intimate mechanical union with the platinum salt. The ferrous salt forming the impressed image is capable of reducing the platinum salt in contact with it only when the two salts are brought into contact with potassic oxalate, as before described. But the ferric unaltered salt has no action on the platinum salt when so treated; therefore all that is necessary is to immerse the paper in a solution of this salt when almost simultaneously the ferrous oxlate dissolves, and in doing so at once reduces the platinum salt lying in contact with it, and this in proportion to the stage to which the production of the ferrous salt was carried by

the exposure to the light under the negative. Where any portion was protected from light by the negative there does the ferric salt remain unaltered, no reduction of the platinum taking place; but where, on the contrary, the light was allowed to exercise its full action, so is its conversion into the ferrous salt demonstrated by the copious reduction of the platinum as a black pigment, which is really metallic platinum in a state of fine division.

All chemical action being accelerated by heat, the developing solution is warmed previous to the immersion of the prints, hence the term "hot development" is now applied to this operation, in contradistinction to cold development more recently introduced. The print acquires its full vigor after it remains in contact with the potassic oxalate solution for a few seconds, a more prolonged immersion not bringing out any more details.

It only remains to remove the ferric oxalate, and the print is finished. This is effected by immersion in one or more changes of greatly diluted hydrochloric acid, which dissolves it out, leaving the image unaffected.

COLD DEVELOPMENT PROCESS.

In the process just described the platinum salt was applied to the paper as one of the ingredients with which it was prepared. In that which is now to receive consideration there is no platinum in the paper, which is prepared by being coated with ferric oxalate, to which has been added a minute quantity of a salt of mercury (the chloride) in the proportion of about one to one, and a quarter grain to the ounce of ferric oxalate solution. Paper so prepared keeps good for a long time. It is now ready for exposure in the printing frame.

The developing solution consists of from thirty to one hundred and twenty grains of oxalate of potash and from five to fifteen grains of potassic chloric—platinite. It will be seen that there is considerable latitude allowable in the composition of this developer as to proportions, but nine grains of the platinum salt may be considered an average strength to each ounce; that of the oxalate may be varied within the proportions above given. The development proceeds slowly, and it may be stopped at any desirable stage.

If warm tones are wanted the proportion of oxalate in the developer must be small; cold tones are obtained by increasing the proportions of the oxalate. Fifty grains per ounce may be considered a good average strength. It is

recommended that in order to prepare the developer in an easy manner a good plan is to keep stock solutions of the oxalate of potash and of the platinum salt. A good strength for the former is one pound of the salt dissolved in fifty-four ounces of water, and for the platinum salt, fifty-six grains dissolved in one ounce of water.

Of the many methods of applying this developer perhaps the most generally used is by floating. The print is floated in the manner usual with platinotype prints, and it may be allowed to remain floating on the surface until complete development has been effected, but it is preferred to remove the print as soon as it has been well wetted, and then to hold it in the hand, carefully watching the process of development until the right point has been reached, when it is immediately plunged into the acid clearing bath. Instead of holding it in the hand it may be laid on a piece of glass or other convenient support, and then by means of a brush wetted with the acid clearing solution, the latter may be applied to any parts which it may be advisable to prevent from reaching their maximum intensity.

For very large prints the best and most economical arrangement is to apply the developer by means of flannel-coated rollers. The developer may also be applied very well by means of a spray producer, or it may be brushed on by a camel's hair brush.

The acid clearing solution consists of about one drachm of hydrochloric acid to the pint of water. Its function is to clear and brighten the print.

PLATINUM PRINTING-OUT PROCESS.

This process differs from those previously described, as the pictures are printed out in the frame, the exposure being carried on until the print acquires its full depth. The paper is prepared by being heavily sized and treated with the sensitizing solution already described, to which is added the developer. Moisture is a condition of success during exposure, in the absence of which the printing will be slow and irregular. The printing-out platinum process supplies the acme of ease and simplicity, in combination with the other valuable properties already dilated upon.

"I wish now," shrieked the angry young wife, "I wish now, George Whackster, you had married Luce Jones instead of me! That 's what I wish!" "I would have married her," howled the equally angry young husband, "only she would n't have me, and you would."

FREE SCHOLARSHIPS IN TECHNICAL SCHOOLS.

The recent public hearing before members of the city council on the petition of the trustees of the Lowell Textile school for an appropriation of $7,000 from the city treasury is still being discussed by operatives. It has been felt by some members of the city council that the legislature, as compared with its treatment of the technical and agricultural colleges, is not treating the textile schools fairly.

Members of the city council who have been studying the subject, call attention to the following acts which have been passed for the benefit of the technical schools in Boston and Worcester and the agricultural college in Amherst.

Chapter 103 of the acts of 1887 —Resolved, That there be allowed and paid out of the treasury of the commonwealth the sum of $100,000 to the corporation of the Institute of Technology in the manner following:

An instalment of $50,000 on Dec. 1 in the present year, and a final instalment of $50,000 on Dec. 1, 1888, said sums to be applied to the purposes of the institute.

And in consideration of this grant said institute shall establish and maintain 20 free scholarships, and each senatorial district in the commonwealth shall once in eight years, in such alternate order as the board of education shall at the time of the first appointment of said scholarships determine by lot, be entitled to one scholarship for a period of four years, to be awarded to such candidates as shall be found upon examination to possess the qualifications fixed for the admission of students to said institute, and who shall be selected by the board of education, preference in the award being given to qualified candidates otherwise unable to bear the expense of tuition.

In case no candidate appears from a senatorial district, then a candidate may be selected from the state at large to fill such vacancy, who may continue to hold the scholarship annually until a candidate is presented from the senatorial district unrepresented, who shall then be awarded the scholarship for the balance of the time for which said district would originally have been entitled to its benefit.

In case a vacancy occurs in any senatorial district after an appointment has been made, then a candi-

date from the same district shall be selected for the balance of the time for which said district is entitled to the benefit, or in the event of no such candidate appearing from the state at large, upon the conditions previously set forth; provided that said corporation shall secure, prior to the first payment above authorized a further sum of $100,000 in addition to the funds now held by it, and to be applied to the purposes of said institute, and shall present satisfactory evidence thereof to the auditor of the commonwealth.

In calling attention to the following act men who have been studying the question say they see no reason why the textile schools should not be classed as colleges and the act amended to include them in the division of any money received from the United States government. They say that applicants for admission to the day sessions of the textile schools should be graduates of the high school. That is all, they say, which is required of any candidate seeking admission to any of the colleges named in the accompanying act:

Section 1, chapter 423, acts of 1891: The commonwealth of Massachusetts hereby assents to the purpose of the grants of money authorized by the acts of congress entitled " An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provisions of an act of congress, approved July 2, 1862," said act being chapter 841 of the acts of the first session of the 51st congress, and approved Aug. 30, 1890.

Section 2. The commonwealth of Massachusetts hereby accepts the annual grant of moneys made by the United States, as set forth and defined in said act of congress, and the treasurer and receiver general of this commonwealth is hereby designated to receive the same annually, to be applied by him under and for the purposes of said act, and the Massachusetts Institute of Technology is hereby authorized to receive one-third and the Massachusetts Agricultural college two-thirds of the grant of money, unless the courts should decide that the act of congress granted all said money to the Massachusetts Agricultural college.

Section 3. The governor of the commonwealth is hereby authorized and instructed to give due notice thereof to the government of the United States.

Section 4. This act shall take effect upon its passage.

Further inquiry shows that from the state treasury, by the act of March 16, 1894, there was given the Worcester Polytechnic school $100,000. That school has been given $3,000 addition annually from the state treasury, and this year received $6,000.

The Institute of Technology, Boston, is by act of the legislature paid from the state treasury $29,000 annually.

A condition required of both technical schools now is that one free scholarship shall be given in each senatorial district of the state. Men who have served on the school committee in Lowell for years say they were not aware any free scholarships were given, and the superintendent of schools says it is news to him.

The question here is, who has been receiving the free scholarships to which Lowell is entitled, and what is necessary for any ambitious young men to do to secure a high grade technical education?—Boston Sunday Globe.

THE WORLD'S GREAT APPLE PROBLEM.

Probably our great ancestor Adam little thought of the trouble he would cause posterity by eating an apple. But now the question as to how many apples he really did eat is a new difficulty.

How many apples did Adam and Eve eat?

Was it one, or was it millions? When the subject was first mooted the editor very naturally replied: "Why, one, of course."

"No," said the assistant editor, "Eve ate one and Adam ate one, too, that's 2."

Then the sub-editor passed along a slip of paper on which was written: "Eve 81 and Adam 81, making 162."

But the poet, who is a man of imagination, capped this with "Eve 81 and Adam 812, making 893.

Then the publisher tried his hand, and his contribution was: "Eve 8142 see how it tasted and Adam 812 — 8,954."

But the assistant beat the publisher, asserting that "Eve 8142 see how it tasted, and Adam 8142 keep her company — 16,284."

The poet who dislikes being surpassed came up to the scratch again with "Eve 8142 see how it tasted and Adam 81242 keep her company —89,384."

Then the humorist, who had been listening quietly, handed in his contribution, "Eve 8142 see how it tasted and Adam 8124210-der a husband was he to see her eat alone, equals 8,132,352."

There the matter rests for the present, and we are very thankful it does rest.—Saturday Evening Post.

KING COTTON.

By E. W. THOMAS, Agent Tremont and Suffolk Mills.

Shrouded in a mystery, or perhaps better be said, in the unknown, is the birthplace of cotton manufacturing. India has the honor, so far as historical data gives us any authentic information. In the light of the present day we can hardly call it manufacturing, as, for a thousand years, the most primitive methods were used for carding, spinning and weaving, these same implements being in use until the last century, when machinery was invented and put in operation in England, which made a revolution in the art and did much to revolutionize the whole world.

Not until mechanical knowledge had been born did the art of manufacturing approach anything but mere drudgery. Dr. Ure describes the change from this drudgery to mechanical action like a transformation of the caterpillar into the beautiful butterfly, when it is changed from a creeping to a winged insect.

Of the four great materials for wearing apparel, wool, flax, cotton and silk, the distribution of them seems to have been directed from a higher power. Flax in Egypt, sheep in Asia, silkworm in China, cotton in India and America. Thus we see the wise distribution, each appropriate for the country in which it was first discovered. All ancient and profane works speak of the wearing apparel as being of silk, wool or flax. Cotton is not mentioned. Cotton is the cheapest of the four materials, is easily grown, cared for, and manufactured as it was in early times by the primitive methods. As early as 445 B. C., Herodotus, in his history, describes what he saw in India, and writes as follows: "They possess likewise a kind of plant, which, instead of fruit, produces a wool, fine and better than that of the sheep. Of this they make their clothes." It is said that for 1300 years this manufacture of the cotton into goods was confined to India. Gradually, as time wore on, the art was on the westward move toward Syria, Asia Minor and Persia. Crossing then the Mediterranean, we find its manufacture next in coast of Guinea, Abysinnia. Columbus, on his voyages also found the natives of the

Southern Islands and South America appareled in cotton fabrics. Strange as it may seem, Spain was next of the European countries to have manufactured cotton extensively, as early as 900. In Italy it dated in the fourteenth century. England was the last of the European countries to commence cotton manufacturing. The earlier records show the manufacture to be in full sway about 1520, and some very remarkable laws were enacted at that time, as to the length and weight of a piece of cloth. Manchester was then in existence, and was the centre of not only cotton but woolen manufacture. From this time on manufacturing acquired a quick and energetic growth, owing to the three great necessities for such; these were the water power, coal and iron. Until 1760 the line of manufacturing was by crude means. The dawn of a new era had arrived, the era of invention. To it, and the efforts of those who were interested, the country became in a few years the great centre of manufacturing, which it has so ably held. In 1738 John Kay, a native of Bury, suggested a mode of throwing the shuttle. This was called the fly shuttle, and enabled a weaver to produce nearly twice as much cloth. In 1760 the drop box was invented by Robert Kay Peculiar as may appear, these inventions for a time met with a most obstinate resistance to their use by workmen, that Kay was obliged to flee from the country. Up to this time spinning had all been done on the wheel, one thread at a time. The improvements in looms demanded so much yarn that it could not be supplied by this primitive process. Sir Richard Arkwright has been claimed to be the inventor of the process of spinning by roller, whereby, instead of one thread being spun by one pair of hands, several hundred might be spun. This was patented in 1738. From this time on various improvements were invented, but it was not until about 1760 or thereabouts that the Factory System, so called, was introduced. This was simply a mill in which the various processes were done. To Samuel Crompton we owe the invention of the mule. From this date the building of mills and the manufacture of yarns and cloths extended very rapidly.

The cotton industry of this country may now be considered in part. In Philadelphia and surrounding towns, cotton spinning and carding in the primitive way had a centre as early as 1780. Naturally every town had many of the old-fashioned spinning wheels and hand looms. The news of the in-

ventions of Arkwright, Cartwright, Crompton and others in England interested our forefathers, and, as a result, in or about 1800, some efforts were made to bring to this country some of the appliances used in England.

Not much success was, however, met with until the establishment, by several gentlemen of Boston, in the formation and building of a mill in Waltham. These men and their efforts, will be considered later, in connection with their works for our own city.

COTTON AS A PLANT AND FIBRE.

Passing now to a brief description of cotton. It is a plant found in nearly all the warmer climates of the world, but is peculiarly so in India and America. To give any intelligent idea of all the features connected therewith would consume too much time this evening; therefore the following facts will be given in brief, more particularly as applying to that grown in this country. Cotton in its uncultivated state, or when growing "wild," has not the fineness nor development as when under cultivation.

The United States is the great cotton growing centre of the world today, although large quantities are grown in India, China and South America; but, in these latter countries it is almost wholly used for home consumption.

The cotton fields are generally planted in April, in rows about four feet apart, the plants being from one to two feet the other way. There are many varieties of plants, some but eighteen inches or twenty-four inches in height, and others growing five to six feet; the general average may perhaps be taken at three feet. When in full bloom they may be some two feet in diameter. After the plant appears above ground it is about forty days before the buds show; in about four weeks the flower and in about seven weeks more the bloom is ready for picking. The fields have to be carefully weeded, but other than this not much attention has to be given, except in dry weather to pray for rain, and in extreme wet weather to pray for it to cease. The normal crop of cotton for the country is about 9,000,000 bales of 485 pounds each. This amount varies year by year, and as the larger share of it is sent to other countries the amount of the crop and other conditions mentioned determine in a measure its price.

There are many grades of American cotton. Generally, however, there are three distinct classes, called the Gulf, Upland and Texas. Each of these have a series of

classification that is known and accepted all over the world. This division is known in the market as Fair, Middling Fair, Good Middling, Middling, Low Middling, Good Ordinary and Ordinary, making seven distinct grades. These are again sub-divided by adding the word strict, which is half grade between those already given. Today the larger amount of cotton is grown in Texas, followed by Georgia, Mississippi and Alabama.

The seed of the cotton was, up to the close of the war, generally considered worthless, but, today, its value is said to be as much if not more than the lint itself. By pressure the oil is extracted and cotton seed oil is the product. The hulls are used for fertilizer, and the inside for cotton seed meal, a favorite food for cattle and sheep. Cotton seed mills are almost as much in evidence in the South as cotton mills. The value last year, of what was considered worthless at the close of the war, was $50,000,000. The details of the cotton picking will be considered later.

On nearly all farms, or at least in every town, is the press to enclose the cotton picked. These presses are crude affairs, generally operated by hand or by a pair of mules. The cotton is pressed into a bale about 28 to 30 inches thick, then is shipped to a shipping centre, where are located what are termed compresses — hugh, massive affairs, where the original bale is compressed into eight, ten or thirteen inches in thickness. This is done to save space on ocean steamers and freight rates by rail. The general average weight of a bale is about 485 pounds. They are covered with a coarsely woven cloth called gunny bagging, also bound with six or seven wrought iron band. This bagging and the ties cost about 75 cents per bale, but the buyer has to pay for it by the pound the same as for the contents of the bale.

Time will not permit of farther remarks in this line, although much might be said that would be extremely interesting.

EIDER DOWN.

About 10,000 lbs. of eider down is gathered annually in Iceland, 7,000 being exported to foreign countries. Formerly the peasants used to receive over 21s. per lb., but the price has now fallen to half that amount. The peasants seldom receive money, being obliged to barter their down for merchandise furnished by the Danish merchants at the little settlements on the fjords. An eider duck farm at Isafjord is thus de-

scribed: "On the coast was a wall built of large stones, just above high water level, about three feet high and of considerable thickness at the bottom. On both sides of it alternate stones had been left out so as to form a series of square compartments for the ducks to make their nests in. Almost every compartment was occupied, and as we walked along the shore a line of ducks flew out one after another. The house was a marvel; the earthern walls that surround it and the window embrasures were occupied with ducks. On the ground the house was fringed with ducks. On the turf slopes of the roof we could see ducks, and ducks sat on the scraper." Writing from Iceland a correspondent says: "All accounts I have read about eider ducks say that nests are robbed of their down twice, the ducks supplying it each time from her own body; the third time the drake gives his white down, and this is allowed to remain. But I was told by farmers in Iceland that now they never take the down until the little ones are hatched. I has been found that the birds thrive better and increase faster when they are allowed to live as nature meant them to do. So now the poor mothers are no longer obliged to strip themselves of all their down to refurnish their despoiled nests. Sometimes, if the quantity is very great, a little may be taken, but enough must be left to cover the eggs when the duck leaves her nest for food."

To make a new pen write well the following process is recommended: Dip the pen—a cheap steel one—into the ink, hold it for a few seconds in the flame of a match, wipe it carefully, then dip it in the ink again. This is said to be a never-failing process.

To make a good fly paper, boil together equal parts by weight of glue and molasses. With an old knife spread the mixture while hot over heavy brown paper. Place a piece of this paper in every room in the house. It will capture every fly in the room within the day.

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A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager.

PUBLISHED MONTHLY

AT

No. 67 Middle Street, - Lowell, Mass.

BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid 50c.
Single Copies 5c.
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the fifteenth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

You will find it difficult to make a bag of wind stand erect.

. . .

Twenty-five students received certificates of merit at the graduation exercises.

. . .

Miss Katherine Burrage of Lowell has the honor of being the first woman graduate from the first and only textile school in New England.

. . .

Professor Fenwick Umpleby of the Lowell Textile School, has gone to Europe to make a special study of the technical and textile schools in Germany and England.

The aldermen and council in joint convention gave a hearing upon the petition of the trustees of the Lowell Textile School for an appropriation of $7,000 for the support of the school. They voted the money, to be raised by taxation. The school is safe for another year.

. . .

With stocks booming, indicating money-seeking investments, banks full of money, farmers paying old debts, country merchants buying liberally and business men smiling and mills running overtime, there is no doubt that Old Prosperity has returned. It is now our duty to make the most of it, for there will come a time some day when these conditions will be lacking.

. . .

Is the figure seven the lucky number of the Textile School? There were seven graduates from the day classes, seven from the evening design class, seven from the evening weaving class, seven from the carding and spinning classes, there are seven students who have obtained positions during the past school term and still hold them. The trustees petitioned for an appropriation of seven thousand dollars and the newspapers on the seventh day of June gave out the good news that the money was granted.



The final examinations in the Lowell Textile School were held from May 22 to June 1, inclusive.

. . .

Seven students received diplomas, they having completed a three-years' course.

. . .

Without knowledge and practical experience, volubility of words is, as Cicero says, "empty and ridiculous."

To be successful as a teacher one must have a thorough knowledge, full and exact, of the subject dealt with. Speaking at random is nothing but as "sounding brass or a tinkling symbol."

. . .

Professor Edgar H. Barker has been admitted to the sacred order of Benedicts. The initiation was performed before a select few, who had taken all the degrees. There were also several who contemplated joining the order. The ceremony was simple, but impressive. It was remarked "that if Prof. Barker could stand the side degree they would go and do likewise."

EVENING WOOLEN AND WORSTED

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THE CRANK'S STORY.

I never was anything but a crank, and although the world is not yet ready to do without me, I never had credit for all the help I have given it, one reason being that no two persons ever agreed as to how much I did help. Because, although I was most willing to work, I was never two seconds at a time in the same mind, and if I did come round to the same point pretty often, I did not stay there long enough for my friends to agree as to just what I was doing.

I was so uncertain in my movements that some gave me up and tried to get along without me. But they generally came back and asked my help again.

I am of a very old family, although I did not set up a family name until a century or so ago, when somebody tried to tie me to a steam engine with a patent, which so disgusted my friend Watt that he sought help from a sun and planet. But, dear me, I turned a potter's wheel or pulled water out of a well ages before.

Of late years by going into partnership with steam, we jointly do more work than all the rest of the world put together.

I suppose steam, being younger and more pushing than I am, is the reason he gets all the credit for what we jointly do.

Time was not long ago when it took me and steam and 10 lbs. of coal to get a horse power per hour. Latterly I and steam have succeeded in getting a horse power per hour out of less than 2 lbs. of coal.

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THE AMERICAN FLAG.

On the 11th of February, 1866' Hon. Benjamin F. Butler, of Massachusetts, introduced to the officers of the Senate D. W. C. Farrington, agent of the United States Bunting Company of Lowell, Mass., who presented to them, for the use of the Senate, a flag manufactured by that company — 21 feet fly by 12 feet hoist. It is believed to be the first real American flag ever raised over the capitol of the United States. Heretofore all of our flags have been manufactured from English bunting, and every effort made to substitute a domestic texture capable of resisting the wind and the air has signally failed. Gen. Butler, having learned this at the navy department and having an interest in the United States Bunting Company of his own town, informed Capt. Fox that he believed that company had produced a fabric that would be superior to the foreign article. A test was accordingly ordered by the navy department, fully realizing the confident anticipations of Gen. Butler, and proving the American bunting to be better in color and in quality than the English product. The general wrote to the secretary of the Senate for authority to make a present of one of these flags, to be raised over that body. That officer, having consulted Mr. Forster, president pro tempore, the general's proposition was accepted, and today the flag was placed in the hands of the sergeant-at-arms. Tomorrow it will be hoisted to the senatorial flagstaff and unfurled to the breeze.

Before acceptance the cloth for the flag is subjected to severe tests. It must weigh five pounds to every forty yards, and bear a strain of seventy pounds to two square

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inches before tearing. It is steeped in brine for six hours to set the colors, and then exposed to the sun for six hours to prove them fast.—Philadelphia Press, Feb. 16, 1866.

There are people who seem destitute of the minor conscience which governs the details of our ordinary existence. They are always begging and borrowing, but they never replace, except under pressure, and then you tremble at the probable condition in which you will find that which to you was perhaps a sacred treasure. They never do a thing at once when it needs to be done, and when it can be done with most benefit and least loss.

How many women put away at once that which they take off or bring in. How many exact this of their daughters? What they usually do is to throw the article or garment upon the chair or table, bed or bureau, move it from one place to another, and possibly so mislay it as to suppose they have lost it or some one has stolen it, before they finally work themselves into a sufficient amount of energy to put it where it properly belongs.

"Scottish Clans and Tartans," a pocket volume of the clans and tartans of Scotland, 96 colored plates, showing the arrangement of the colors of the tartan; there are lists of natives dyes, of the badges, and the war cries of the various clans.

The illustrations of the tartans are taken from authentic sources.

The book is invaluable to designers of ginghams, checks, plaids and dress goods.

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DRYING AND CONVEYING WOOL.

A representative of the "Bradford Observer" has inspected an equipment of the wool drying and conveying apparatus manufactured and patented by W. Summerscales, Limited, engineers, of Keighley. The apparatus has been in use for some time, and has now been adopted by about a dozen firms, including some of the principal woolcombers of the Bradford district. Although simple, it fulfils the two functions of drying the wool and conveying it from the washing-shed to the combing-room. Both operations are carried on simultaneously through the agency of air driven by an ordinary rotatory fan. For very fine wools heated air is regarded as unnecessary, but for the ordinary sorts the air first passes into a steam heater, where its temperature is raised to about 180 deg. Fahr. By means of the fan it is then driven along a galvanized steel tube of a diameter suited to the amount of work to be performed, but normally of about 16 inches. Here it receives from a hopper the wool to be dealt with, and carries it forward. The principal novelty of the apparatus consists of the manner in which the wool is introduced into the tube. At the end of the washing machine is fixed a hopper which opens at an angle into the tube, the blast of air in which, consequently, creates a suction action. Wool delivered by the washing machine into the hopper is thus drawn into the tube and carried forward to wherever it may be required. On its way the heated air dries the wool considerably, and the process of drying is completed by an appliance at the delivery outlet. Opposite to this

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end of the tube is fixed a revolving reel of trellis work. The wool from the tube is delivered upon this, and is further dried by the air being driven through the interstices of the trellis work. The moistened air then escapes through a screen. In the apparatus inspected the fan was about 34 inches in diameter, and the conveying tube 16 1-2 inches. The reel was regulated to revolve once a minute, and by this appliance thirty packs of wool a day were conveyed from the washing machine up to a height of about 20 feet, and then horizontally for a distance of 120 feet into the carding room. The apparatus required no attention, whatever, and was working with absolute smoothness and regularity, giving so much satisfaction that the proprietors are already making preparations for the fixing of a second apparatus of the same kind.

DYERS MADE TO ORDER.

The gradual increase in the number of technical schools in this country is one of the best signs of progress, showing that those young men who have obtained their education in institutions already established are living testimonials to the value of the instruction obtained therein, and that such young men are of value in the mills and factories, bringing, as they do, a well-constructed foundation for intelligently prosecuting practical work to the lasting advantage of their employers and themselves. It is not the province of these schools, nor do their teaching staff undertake to turn out men who can take positions in dyehouses as boss dyers upon graduating, for such positions must be filled by men who have obtained the practical knowledge of their

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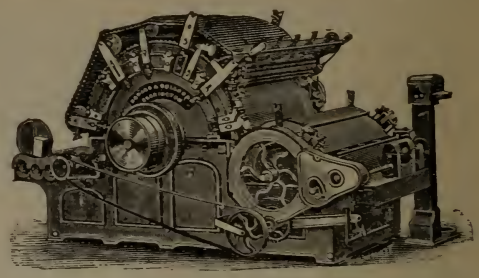
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trade in actual contact with problems brought directly to their attention in the daily routine of mill work, problems that will hardly ever be found in the path of students in schools of dyeing.

One of our esteemed contemporaries, *The Wool Record*, of New York, however, is fathering a scheme leading to the establishment of a school which will aim to send out young men who have constructed a book of colors or shades while students, and which they will put to practical use in their dye-house, when the manager gives them a piece of work to do. This is very beautiful to contemplate, but how will practical men, trained dyers or mill owners, view such graduates, how will such graduates contemplate a position which may be offered to them in a mill upon the strength of a diploma issued from such a school.

The dyer of today is just as different from the dyer of twenty years ago in the scope of his theoretical and practical knowledge of the ins and outs of his trade as the engineer or physician, and the statement made by the same journal that 90 per cent. of the dyers of America are grossly incompetent is a rank injustice to them. No doubt can reasonably exist, but that there are many dyers who are incompetent and ignorant, but to say that 90 per cent. are is false.

Mr. Oldboy — I am a self-made man, sir. I began life as a barefoot boy.

Kennard — Well, I wasn't born with shoes on, either.

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I. O. U.

A laughing world when I say I,
A chaffing world when I say I,
And yet you think before you try
'Twill different be when you say I.

A cheering call to hear "Heigh Oh!"
On mountain tops you hear it so;
In valleys where the trade winds blow
The echo makes it sound I owe.

A well known phrase, "Why, I know you!'
Now, let me think — why you are you —'
And then the other gives the cue.
The greeting should be I. O U.

—Ormsby A. Court.

DAIRY SCHOOL FOR KANSAS.

The Kansas legislature passed a bill making appropriations for the State Agricultural college in which $25,000 was allowed for a dairy building, $6,000 for equipment of building, and $3,000 for a herd of cows and a place to put them. This is a much needed addition to the equipment of the Agricultural college and will be greatly appreciated by the dairy interests of the state. Beginning Jan. 2, 1900, and lasting for 12 weeks, there will be three courses offered in dairying—a course in creamery butter making, a course in cheese making, and a course in private dairying. The latter course might also be called a creamery patron's course. Special attention will be given to the production of milk. For the first time in the history of the state Kansas' young men will have an opportunity to perfect themselves in any branch of dairying they desire. Applications are already coming in for next year, and it is to be hoped that a large number of young men will avail themselves of the opportunities at the Kansas Agricultural college.—D. H. Otis.

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LEARN A TRADE, BOYS.

A correspondent in the Sewing Machine News, quoting from the Ladies' Home Journal an article on the value of a trade, makes some remarks of his own, which are practicable and pertinent to the subject.

I remember years ago when I was a very young man, writes John Coates in the Journal, meeting John Roach, the great ship builder, in his ship yard at Chester, Pennsylvania. I remember, too, what he said about the value of a trade to the average boy.

"Young man," he said, laying his great broad hand on my shoulder, and looking at me earnestly with his keen, steel-blue Irish eyes, "next to a clear conscience, a trade is as good a thing as any young man can have in this country. You can carry it with you all your life long; you have to pay neither rent nor taxes upon it, and it will help you around a sharp corner when most other things will fail."

I have never forgotten that utterance from a man who started in life—after landing in New York from Ireland—as a helper to a machinist, who became the leading ship builder of his time, and who, up to the hour that he was stricken with a fatal illness, could take the place of any of his workmen, whether it was a man driving rivets or an expert putting together the most delicate parts of a steamship's machinery.

Something very like what John Roach said I heard another great man, who is now dead, say. This was Peter Cooper, a man of whom American boys cannot know too much, and whom they certainly cannnot too much admire.

"If I had my way," said the venerable philanthropist, on the occa-

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sion to which I refer, "I would give every boy a trade. Then I would have him stick to it, love it, and be good to it. If he does, it will be good to him."

To which the writer in the Sewing Machine News, adds:

To an observing and interested person how sad is the spectacle, and how forcible is the fact, which ought to be food for serious reflection to every American citizen, that very few of our American boys ever learn a trade, and as result almost everywhere the leading mechanical positions are filled by men of foreign birth.

Why is this? Is it because our boys are less able? Is it because there are no facilities for learning trades in this country? To the last question the argument may be advanced that the trade unions lay too many and too heavy restrictions regarding the number of apprentices which will be employed or allowed. Argument admitted and the point taken granted. But the bottom cause is Young America's "don't want to." He would rather stand behind a counter in some store, or canvass for some agency, or work in some factory at piece work, where he can earn more money, at first, per week than if put learning a trade.

This would all be very well provided he could be sure that such employment would last as long as he needed to work for a living. We all know that no substantial building exists, or can exist, without a good foundation.

Encourage them to learn trades and afterward to rise in them. Having a good common school education for a starter, their native smartness will enable them to master their trades, and by avoiding all unclean or unsteady habits, they need have no fear for the future, for their services will always be in demand.—*Scientific American.*

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A TOUGH STORY.

When it comes to toughness, Texas grass-fed beef is entitled to the blue ribbon, and the average Texas landlord is sure to get the toughest beef in the market. "Is there a carpet-beating establishment next door?" asked a newly-arrived guest at an Austin hotel.

"Not that I know of," responded the urbane clerk.

"Well, then, you must have a blacksmith's shop in the cellar. Do you shoe horses down in the cellar?

"No, of course not."

"What's all that pounding, as if there were a boiler factory in full blast or some cooper at work driving down hoops?"

"Oh, that's nothing but the cook pounding the beefsteak for breakfast."

The trust bubble expands. Look out! It will burst.

Moral courage will always rank higher than physical. The one is a daily necessity, while the other may be required only in emergencies.

When you set out to do anything never let anything disturb you from doing that one thing. This power of putting the thought on one particular thing and keeping it there for hours at a time takes practice, and it takes a long time to get into the habit.—Thos. A. Edison.

Let every man watch over his habits, cultivate those which are good; break off from those which in the end destroy both body and soul.

The man who pays his expenses the first year of his business venture is pretty sure to make a decided success of it afterward.

It is a bad plan to begin the day in a fret, for it will be a day of happiness lost.

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CHARITY.

The most popular creed in existance is that of human charity. Its exponents belong to every grade of humanity, and its altars are ever surrounded by worshippers among the high and lowly of earth. This common creed often appeals to the noblest impulses and emotions of our natures, and in order to attain the divine standard of perfection which duly characterises its workings, must needs detach itself, so far as efficient practicability is concerned, from all rigid sectarian restrictions of every form of religious belief. In short, the exercise of this creed of charity, which, outside of kindred love, truly constitutes the only natural-born creed of the human heart, must largely rely upon the merciful dictates of unbiased good judgment. If we ever desire to fully reclaim an unfortunate fellow-being, or to satisfy the hungry cravings of a mendicant's stomach, we must not deny him a lift out of the darkness, even if he refuses to step upon the platform of our individual ideas of salvation—neither should we ever cut the slice of charity's loaf with the merciless knife of bigotry.

THE AMERICAN WOMAN.

The American woman is like the American climate—she has an Indian summer. Sometimes fading early, the American woman revives at the age when the English woman settles quietly down into comfortable and easy-going middle-age—the middle-age of *embonpoint*, of shapeless dress, and neglected charm. It is in this Indian summer that you see the American woman often at her best—with her exquisite manner, the eagerness to please (which is as much a training of the American as of the French woman), with her care for person and her dress, as if she were still a young lady with all the world of love still to conquor.

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Lowell Textile Journal.

LIQUID AIR.

By Wm. W. Crosby, S. B.

In these days of rapid development, one is ever on the alert to appear always at ease, never mystified, and ever ready to discuss whatever innovation may be put before the public; and there is always one class of people which, although unwilling to be termed dissatisfied, is, nevertheless, over-ready to take up with any new thing and hail it as the long-sought philosopher's stone, regardless of any inherent vital conditions, which a careful investigation would disclose, which would stamp the whole thing as fallacious. It is needless to dwell upon Keely, whose motor, apparently influenced by sympathetic vibrationary energy, was in reality driven by concealed tubes filled with compressed air; likewise it is a waste of time to go into detail in regard to the Jernigan-gold-from-sea-water-scheme, where a diver "salted" the sample, which was taken in the presence of experts, leading thousands to invest money in the company. Nor are these examples alone in their fallacies, but they serve to illustrate very well that state of affairs in which the old saw, "A little knowledge is a dangerous thing," is most strikingly exemplified.

It is a fact that sympathetic vibrations exist, and that there is a certain amount of gold in sea-water; but the laws which govern their useful application to every-day life are too well known to allow more than two sensible thoughts for them. If some one should announce that he had discovered a new law, or had developed a new combination of existing laws, then it would be worth while to listen to him, and note his practical demonstrations; even then too great care could not be exercised in forming judgments.

We find the world about us filled with great varieties of things, some hard, some soft, some large, some small, of various colors, and so on *ad infinitum*, but above all, we notice



J. W. McALISTER F. A. NUGENT H. BINNS E. S. SWIFT W. H. STOPHERD
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Principal of Weaving Dept.

that whatever be the condition of the body, as we note it, under what we are pleased to term normal conditions, it soon assumes new characteristics, if these surrounding conditions be changed; and by conditions let us consider them broadly as temperature, external pressure and volume.

Because water is liquid and rocks are solid, as we are most generally accustomed to see them, we must not infer that they are never different, for indeed we know water as a solid and as a gas, and if we have been near a volcano we have seen the lava solidify into a rock. By analogy, we think of all known substances as assuming under different conditions the three states, solid, liquid and gaseous. Indeed this is well borne out by experiments, for nearly all known substances have been made to assume these states. But we have no authority to say that these are the only three possible conditions, for there may be super-gaseous or sub-solid states, influenced by laws of which as yet we know nothing. The laws which govern the known states are, however, well-defined now, and theory and practice go very well together.

For a long time the laws of gases have been under investigation in their mechanical and thermodynamical relations; it is no matter of uncertainty, for instance, to say for a given gas, what amount of energy it contains or to predict as to its behavior under given circumstances. If theory be of any value at all, it is most surely to enable us to predict beforehand just what may be expected to occur under particular conditions. When the prediction and the fulfillment have recurred again and again, then it is that we feel our ground to be sure.

During the past few years mechanical apparatus of all kinds has been improved, so that inventors have had at their disposal means of attaining the best results. Some gases have already been liquified, but only when extreme measures were not needed. Air, which is really a mixture of nitrogen and oxygen in the ratio of about 4 to 1, with a few other elements, which are of comparatively small importance, had long defied every attempt to liquify it. There is a well-known principle that until a certain degree of coolness be reached no pressure, however great, can make a liquid of any gas, this point being called the critical temperature. But to attain this and keep the pressure, too, was a difficult problem. At length, by dint of effort, minute quantities of the liquid were ob-

tained, but nothing in the way of any considerable amount was produced until Mr. Tripler reproduced an apparatus which had been described in Germany some years before.

If you pump up your bicycle tires with a hand pump you will doubtless notice that the barrel of of the pump is much warmed. At first this may be ascribed to the friction of the piston, but an equal number of strokes without pumping against pressure will produce almost no change in the temperature. Whence then came the heat?

One of the most universal of laws is that of the indestructibility of energy; it may be transformed, transmuted or divided, but the sum total will still be a constant. You compress the air in the barrel of the pump, and then watch for results; if the pump is attached to the bicycle tire the air enters through the check valve when compressed sufficiently to lift it and is there held. Could you measure the number of foot pounds of energy you exert in raising the air to the required pressure, and then allow this same air to react, it would give out just as much energy as was originally impressed. If you should put a thermometer into the compressed air you would find that the temperature was quite materially raised; but this same air in reacting in an engine where you measure the work it does will fall in temperature, in fact, a careful study will show that the expansion of the compressed air is at the expense of the heat it contains.

Should you attempt to use in an expansion engine air of the same pressure as in the first case, but at normal temperature, you would find the resulting temperature to be so low as to freeze up the whole of the apparatus if any moisture be present. Yet this very principle permits of reducing air to a liquid.

Atmospheric air is compressed mechanically in three cylinders, first to about 60 pounds, then to about 250 pounds, and finally to about 2000 pounds to the square inch.

At each compression the temperature rises, but the air is cooled down to the normal temperature by a water jacket, so that when the final compression is completed the air is no warmer than at the beginning, yet in reality many thermal units have been extracted, which would have been entirely impossible with the air free in space.

If now this air under so great pressure be allowed to expand by removing a part of the pressure, it will seek the necessary heat from whatever be nearest at hand. Sup-

pose there be a tube leading from the reservoir of the compressed air ending in a small orifice, outside this tube is another of larger diameter but closed at one end and slid over the smaller one so that whatever gas escapes from the small tube must pass back outside of it, but inside the larger one. If now we cover the outer tube with a good non-conductor, and start a flow of compressed air in the inner tube, we will have the following actions: The first portion of air leaving the orifice will expand, and in so doing will abstract a small amount of heat from the air flowing forward in the inner tube. When this portion of air comes to the orifice it is already colder than was the first, so that when it expands it takes up more heat from the air in the inner tube. This progressive process goes on until liquid air is the result.

So far all is well, but when we are to reverse the process, what then? Unless some new principle be established, or some as yet unheard of property of nature be brought to light, our liquid air is of no use as a motive power unless we supply all the heat that was abstracted from it in rendering it a liquid. To be sure, occupying as it does, scarcely more than 1-800 of its original volume, there is the possibility of storing a considerable amount of energy in a very small space; but there is a long step to be taken ere it can be used as a motive power, for reasons referred to above.

As a refrigerating agent the use of liquid air is much nearer at hand, but even here there is much work to be done. As yet it has not been attempted to confine it, only to protect it as far as possible from the invasions of heat, by means of non-conductors, or, better yet, a Dewar bulb, so called after the inventor, consisting chiefly of a double vessel where the intervening space is rendered a vacuum. Here the preservation of the liquid is limited to a few days; even then only a part of the liquid is retained, since by the evaporation of the first portion is the remainder preserved. A cylinder which would contain about 1 1-2 cubic feet of liquid air would need to contain about 8000 pounds of steel in order to be strong enough to withstand the pressure of the air. We are told that cans of the liquid are transported considerable distances. In such cases the insulation is made as efficient as possible, and the vessel is not tightly closed, but allows the escape of such portions as evaporate. By this evaporation as above suggested large quantities of heat are withdrawn, thus keeping the remainder cool and liquid.

The subject is a most fascinating one, and speculation in "air" castles could go on *ad infinitum*, but until more experimental knowledge is supplied we must wait.

Wm. W. Crosby, S. B.

AN INVOLUNTARY BATH.

Don't monkey with the extinguisher unless you know the combination.

It would seem that the unexpected is likely to happen about once in so often, and it is not known that sundry views with reference to the functions of fire extinguishers have been unsatisfactorily settled. The night, after the fire on George street, one of the brigade was dilating on the usefulness of the fire extinguisher and its phenomenal clerity in getting down to work. He said he knew whereof he spoke. They had these infernal machines at the fire hall, and all the user had to do was to turn the concern upside down, pound once on a piston and things would fly. There is no stopcock on this kind of extinguisher.

Now mine host Snowden, of the Snowden House, had just received a new and improved variety of extinguisher, warranted to be several times more energetic and prompt, and to dispense a more villainous acid fire-killing solution than any other. The peculiarity of this particular machine is that it only requires turning upside down when immediately its vitals get to work and hustle out the contents. The fire brigade man, who should have known better, seized the machine and turned it over to find the plunger and explain. Before he could locate what was'nt there the thing had begun to fiz, and having no stopcock, fired the contents around the hotel office, over the counter, and on the disinterested spectators, of which there were a few. A traveller sitting on one side got about two gallons of the solution squirted over his clothes and he ran out to escape the deluge. The thing was put out doors where it fired itself dry. This morning there was a suit of clothes to settle for at an advance on bargain day prices.

The picturesque American term "monkey wrench," used to describe an adjustable wrench that seizes the nut on two sides, seems to be unknown in England. There the wrench is called a spanner, because it spans the nut.

Auto-mobile red is one of the new colors of the season. It is named after the electric horseless carriages, and is a reddish heliotrope of a glowing warm shade, most attractive in cold weather.

SIMPLE LESSONS IN PHOTOGRAPHY.

BROMIDE PRINTING.

In the processes of taking prints for negatives which have so far been described, the student will have noticed that in each case the illuminant employed was ordinary daylight. But there are, possibly, occasions when, from lack of opportunity or other circumstances, it is impossible for the photographer to avail himself of the solar rays for printing purposes, and hence the "printing-out" processes, as they are termed, are denied him for reproducing his pictures on paper. It is here that bromide printing comes to his aid, inasmuch as its distinctive peculiarities are that the exposures may be made to artificial light, and that the image so impressed on the sensitive surface may be developed in a manner similar to that of negatives obtained by camera exposures.

Bromide paper is simply suitable paper coated with bromide of silver emulsion, containing a relatively small proportion of gelatine. For prints the same size as the negative the sensitive surface is placed in contact with the latter in an ordinary printing frame, such as that used for daylight printing, and the rays emitted by an ordinary jet of burning coal gas utilized for the purpose. It is impossible to give anything more than an approximate idea of what the exposure should be. With a negative of average density, a light of the character mentioned, and the frame held about a foot from the flame, forty seconds should suffice. This assumes the employment of the rapid kind of bromide paper in commerce; of late years several degrees of rapidity have been introduced.

To develop the image a modification of the iron developer first mentioned should be employed. Hydroguinone and eikonogen developers are frequently used for the purpose, but the characteristic black bone of the process is best produced by iron, with which we counsel the student to commence his trials of this paper, as in the hands of the novice it is more likely to conduce to favorable results.

The following formula we have used for several years with complete success, and we are aware that it is extensively employed for the

purpose. Make the following stock solutions:

1.

Potassium oxalate . . .	1 pound
Hot water	48 ounces

Acidified with sulphuric acid.

2.

Ferrous sulphate . .	1 pound
Hot water	32 ounces
Sulphuric	1-2 drachm

3.

Potassium	1 ounce
Water	32 ounces

For development take six ounces of No. 1, one ounce of No. 2, and one drachm of No. 3.

If the picture has been rightly exposed it will begin to develop in two or three minutes, and will be of a deep black bone.

It is necessary to clear the print from the insoluble iron salts left on it in the development, and a solution composed of

Acetic acid	10 minims
Alum	1 ounce
Water	4 ounces

should be applied to it.

When the print has been washed it is to be immersed in the fixing solution, used in the proportion of three ounces of hypo to the pint of water, and, after this again, most thoroughly washed and allowed to dry.

The student will, doubtless, have perceived that the bromide printing process is exceedingly rapid, and that, therefore, its adaptation to enlarging purposes by artificial light places a most valuable power in the hands of the photographer. Indeed, in this regard, it is not too much to say that it has proved a great boon in recent years, and that, on the whole, the results it yields by projection from small negatives exhibit the process in its best aspects. Printing by exposure to artificial light and development of the invisible impression have lately progressed to such an extent that it is now possible to procure a great variety of tones and colors, in addition to the deep black of the rapid bromide process; but to enter into the minutæ of these methods would absorb more space than is at present at our command.

BROMIDE PRINTING.

Mr. A. Pringle addressed the West London society on the above subject, and after describing the details of the manufacture of the paper, proceeded to say what a bromide print ought to be. Experience shows that many do not know what constitutes a perfect bromide print.

The best test of the quality of a bromide print was that it should look like platino at its best. The

great advantage of the process was that whereas a special quality of negative was required for platino and for silver, a negative unprintable by other methods would yield a passable result with bromide. Other advantages were that the process could be worked at night, therefore light and exposure were under perfect command. In regard to exposure no definite rule could be laid down, owing to the want of a standard light, but some observations on development might be of some service. Working with a normal developer, a black-and-white print meant under-exposure, and if the finished print were of a greenish or muddy tone, the developer had not time to act properly. Ninety per cent. of failures were due to too rapid development consequent upon over-exposure.

The great point to aim at was the control of development. A long exposure tended to yield to softness, and, if carried too far, to fogginess. Chalk and soot meant under-exposure; with a thin negative a sub-normal exposure; if hard, super-normal exposure should be given. A developer strong in iron meant strong blacks. If the print were from a thin negative the exposure should be short and the developer strong, and *vice versa*. It was hard to find a better developer than ferrous oxalate. Could not speak so well of pyro or eikonogen, but quinol gave good results. Both the iron and the oxalate solutions should have slight acid reactions. His method of making the developer was as follows: Before mixing acidify the water with sulphuric acid, and then add the iron to saturation, but do not boil. The oxalate solution was also to be saturated and acidified with oxalic acid. As to proportions: For a strong developer, one iron to four oxalate; medium, one to six; a good strength being one to eight. He did not recommend diluting the developer with water, as it engendered graininess. As to the use of free bromide, half a grain of it to the ounce of water was a usual quantity, and he advised that. As to quinol, he recommended Thomas' or any standard formula, but carbonate to caustic as an accelerator. In regard to manipulation, the paper should first be soaked in clean water, sweep over the developer and keep moving, the test of proper exposure being the regular appearance of the image by the time the details show in the high light, the shadows should be plucky. With rough paper, development should not be carried too far, as the print, when dry, looked darker. Thorough washing should follow the use of the acid bath. It

was important to help the hypo alkaline by the addition of a little ammonia, as there was a great tendency for the bath to become acid.

If blisters appeared a little salt in the first washing water would overcome the difficulty. He recommended the use of a squeegee under a rose tap, which would be more efficacious than prolonged soaking in a washer. Mr. Pringle concluded his interesting remarks by practically demonstrating the process, the results being very much admired.

LIQUEFYING HYDROGEN.

Professor Dewar has succeeded in liquefying hydrogen. This great scientific event occurred at the Royal institution. Lord Ravleigh happened to be on the premises at the time and some of the liquid was shown to him. As a Times correspondent, who conveys this interesting information, points out, hydrogen has been liquefied before —in theory. That is to say experimenters have seen, or supposed that they saw, a momentary mist inside a glass tube, and have eked out that equivocal observation with a mass of calculated results. But Professor Dewar has actually produced the liquefied gas to the amount of half a wine-glassful in five minutes, by a process which would equally have produced a pailful had the requisite supply of pure hydrogen been forthcoming. This is a perfectly unique and unprecedented fact. Liquid hydrogen in quantity is not only of enormous scientific interest in itself, but is also of immense importance as placing a new and potent instrument in the hands of investigators. Its absence has long been a bar to scientific progress.

WOOL GREASE LUBRICANTS.

The soap formed by treating wool grease with alkaline lye is dissolved in water and filtered. To this a solution of alum or other alumina salt is added, whereby a brown precipitate is formed, which is called "aluminum lanolate." With this substance, when dried, lubricating oils of any viscosity may be produced by dissolving in it any fluid mineral oil. If dissolved in a small quantity of mineral oil, a gelatinous substance is obtained which may with advantage be mixed with India rubber or gutta percha Solvents for India rubber are said to be also solvents for "aluminum lanolate." In textile industries this substance may also be used as a scouring agent. —R. Krause.

PRESERVING AUTUMN LEAVES.

A few absolutely perfect leaves are better than the scores of common ones that we are tempted to collect. The leaves of the hard maple are always gorgeous in hue and delicate in outline. Those that wear the deepest tints of crimson or yellow are best for our purpose. Oak leaves are shiny and firm, and easily prepared. Nature has always been prodigal to the beech tree, scattering on her boughs the richest, brightest colors. The sumach glows with vivid crimson, and a clear amber shines through the dainty larch and chestnut leaves. Then there are the dull chocolate and mottled red of the blackberry vines, while the poplar and aspen shine out with a silvery white, all speckled over with touches of green. Gather these wild wood beauties, says Good Housekeeping, with as much care as would be bestowed upon a bouquet of garden blossoms, and hasten home with them before they begin to dry and curl. Upon reaching home let the first care be to have two hot irons ready. Cover the kitchen table with three or four layers of newspapers, over which fasten smoothly a soft cotton cloth. Have at hand a lump of beeswax, tied in a small bag, and a similar package of resin. Now, smooth out a leaf with the hand, rub the besswax lightly over the iron, letting the hot smooth surface glide quickly over the leaf, first on the upper and then on the lower side, pressing a little more firmly a third and fourth time until the leaf is thoroughly dry. The glowing colors will be firmly fixed, and will never fade unless exposed to the sunshine. Having treated all the leaves in a similar manner, they are ready for the resin, or "the finishing process." With a moderately hot iron, which must be lightly and rapidly rubbed over the bag of resin, go over every leaf, first on the upper and then on the lower side. This gives them a brilliant, hard glossy finish that makes them almost indestructible. Many persons complain that the glossy appearance is unnatural. While this is true to some extent, yet the protection given by the coat of resin could be obtained in no other way. To preserve small branches, and boughs with leaves, one must proceed in the same manner, pressing the limbs and

twigs with the iron until dry, being careful to avoid the point where the leaf is attached, as too much heat just there will cause it to drop off instantly. To achieve perfect success, be sure to take the leaves when freshly gathered. When the work has been finished, spread a number of newspapers upon the floor of some unused room, and there place the treasures. Give them plenty of space, so that they will not touch or stick to each other. Cover them entirely with more papers, and let them remain in this cool, dark seclusion until ready to decorate the room, or otherwise use them as things of beauty and joy. Reserve a few of the brightest and more perfect specimens for the holiday times when they will come out of their darkness so beautifnl that they who see them will have no longing for summer flowers, but will revel in the unfading glories of the autumn leaves.—Popular Gardening.

College Student — "How did you come to lose the game?"

Captain ('varsity nine)— "Why, their pitcher and catcher had a set of signals that we couldn't possibly understand or get on to—they kept calling out to each other in Latin."—Puck.

One of the most difficult of all minor habits to acquire is that of regularity. It ranks with that of order. The natural inclination of most persons is to defer until the last possible moment, or to put off to another time, where this can possibly be done. Yet habits of regularity contribute largely to the ease and comfort of life. A person can multiply his efficiency by it. The mind can be so trained that at certain hours in the day it will turn to a particular line of duty, and at other hours to other and different labors. The very diversity is restful when attended to in regular order. But let these run together, and the duties mix, and what before was easy is now annoying and oppressive. And the exact difference between many is at this point. There are those who confuse and rush, and attempt to do several things at once, and accomplish little, while others will quietly proceed from one duty to another, and easily accomplish a vast deal of work. The difference is not in the capacity of the two, but in the regular methods of the one as compared with the irregular and confused habits of the other.

Harvard University had its beginning at Newtown, afterward Cambridge, Mass., in 1636.

WATERPROOFING CLOTH.

Without considering the processes by which cloth is waterproofed with such substances as India-rubber, oils, wax and varnishes, there are several processes in practical use by which cloth is rendered non-absorbent of water, and for all practical purposes waterproof — without materially affecting its color or appearance, greatly increasing its weight, or rendering it entirely airproof. These processes depend mainly upon the reaction between two or more substances, in consequence of which a substance insoluble in water is deposited in the fibres of the cloth.

The following are several of these processes:

LOWRY'S PROCESS.

Soap	2 ozs.
Glue	4 ozs.
Water	1 gal

Soften the glue in cold water and dissolve it together with the soap in the water by aid of heat and agitation.

The cloth is filled with the solution by boiling it in the liquid for several hours, the time required depending upon the kind of fibre and thickness of cloth. When properly saturated the excess of liquor is wrung out and the cloth exposed to the air until nearly dry; then digested for from five to twelve hours in the following solution:

Alum	13 ozs.
Salt	15 ozs.
Water	1 gal.

It is finally wrung out, rinsed in clean water, and dried at a temperature of about 80 degs. Fah.

Paut's process requires a small quantity of oil, but in other respects resembles the last. It is given as follows:

Sodium carbonate (com'l)	1 lb.
Caustic lime	$\frac{1}{2}$ lb.
Water	$2\frac{1}{2}$ pts.

Boil together, let it settle, then draw off the clear lye, and add to it—

Tallow	1 lb.
Resin	$\frac{1}{2}$ lb.

previously melted together. Boil and stir occasionally for half an hour, then introduce—

Glue (previously softened)	3 ozs.
Linseed oil	3 ozs.

and continue the boiling and stirring for another half hour.

In waterproofing one-half ounce of this is mixed with a gallon of hot water, and in this the goods are soaked for about twenty-four hours, according to thickness and character. The pieces are then allowed to drain until partly dried, then soaked for six hours or more in a solution prepared as follows:

Aluminum sulphate	1 lb.
Lead acetate	½ lb.
Water	8 gals.

Shake together, allow to settle, and draw off the clear liquid.

Wring out after rinsing, and dry at a temperature of 80 deg. Fah.

Bienvaux uses, instead of glue and oil, as above, the gelatinous portion of sea-wrack grass with a small quantity of a drying oil and and common resin soda soap.

In Reimann's process the cloth is passed slowly by machinery through a tank divided into three compartments, the first containing a warm solution of alum, the second a warm solution of lead acetate, and the third pure water, which is constantly renewed. The cloth on passing from the latter is brushed and beaten to remove the salt adhering to the surface, and finally hot pressed and brushed. In this case lead sulphate is deposited in the fibers.

In Townsend's process two solutions are used as follows:

British gum	20 lbs.
Soap, white	10 lbs.
Water	16 gals.

The solution is boiled for some minutes, and if color is required one pint of logwood liquor is added. The second solution consists of a saturated solution of alum in water, or—

Zinc sulphate	6 lbs.
Water	9 gals.

Bullard's process is somewhat similar to Reimann's. In this strong aqueous solutions of sulphate of aluminum and lead acetate are used alternately.

Berlin waterproof cloth is said to be prepared by saturating the cloth in a solution of acetate of aluminum and copper, then dipping it successively in water glass and resin soap.

Mr. Charles Godfrey Leland, whose researches in folklore and in Romany are well known, has been making a collection of legends applying to Virgil among the peasants and witches of Tuscany. No fewer than 80 legends, dealing with Virgil as a magician, are said to have been collected by his agency.

Thin belts, as wide as possible, give by far the best results working vertically. A thick verticle belt will not hug the pulleys.

FIRE TEST

APPLIED TO TWO METHODS OF BAILING COTTON—INSURANCE MEN INTERESTED.

A fire test of the advantages of two different systems of baling cotton was given on the First Street oval lot owned by the Locks and Canals in the presence of a number of mill officials and insurance men, and it also attracted many spectators.

During the forenoon two large sheds had been constructed on posts under the direction of Mr. W. E. Badger of the Locks and Canals, and the space beneath was filled with pine wood upon which was sprinkled 15 gallons of oil.

Within No. 1 shed were placed eight "American" bales and one of the old fashioned square bales, and within No. 2 shed eight "Lowry" bales and one square bale. The American bale is rolled up from the bat just like a carpet and is covered with a light bag. No wires or stays of any kind are used and it is claimed that it holds itself together by the adhesion of layer to layer and fiber to fiber and by the exclusion of air. The Lowry bale is made in spiral layers and is slightly longer than, but not quite so thick as, the American. The Lowry bales used yesterday averaged 251 pounds in weight, a little less than the American bales. The Lowry bales are bound by four wires and covered with light bagging and it is claimed that they can be sampled more readily than any other and that they cannot be false packed.

The test was held under the direction of the Associated Mutual Factory Fire Insurance companies and its special purpose was to determine which system of baling would yield the greater amount of salvage after burning a given time and being put out with water. Various claims were made for each system and the insurance companies decided to have a test of both systems under equal conditions. The Lowry is the bale of the Planters' Compress company and the American of the American Cotton company.

Chief Hosmer was on hand with a corps of firemen ready to operate the hose when the order to play was given.

The square bales were put in the sheds for the purpose of determining just how inferior they are to the others and how much less

salvage they would yield, but the test was not a success so far as the square bales were concerned for the reason that the square bales in No. 1 shed fell down on the ground early in the fire and the one in No. 2 shed had to be pushed off at once so that it would in no way affect the burning of the Lowry bales. The match was touched to the kindling beneath each shed at 1.35 and in a few seconds each was a roaring furnace. The visitors watched the progress of the flames from a safe distance. The doors swung open at about the same time, No. 2 a few seconds ahead of No. 1, and the red hot bales could plainly be seen from the outside. They rested on strips of railroad iron so as to prevent the possibility of falling through.

The fire was allowed to burn for an hour exactly and during that time every vestige of the wood work had been consumed with the exception of the supporting timbers and the posts, and the cotton was glowing hot. A few of the bales in each shed fell to the ground while burning and the wires of some of the Lowry bales burned off, allowing them to elongate. The outside layers and ends of the American bale were attacked by the fire.

The water was started at the end of the hour and the firemen worked for an hour to subdue the fires.

As soon as possible the cotton will be picked and seperated at the mills of Walter Coburn & Co. in order that it may be determined what proportion of the Lowry bales is a loss and also what proportion of the American. The process will be a slow one but the result will be awaited with interest in every cotton State in the country. If one method shows up better than the other by producing more salvage than it is probable that the insurance companies will take risks on that at lesser rate than any other. The insurance companies' conclusion will amount to practically an endorsement of the bale which best stood the test.

The test was given under the direction of Captain C. H. Phinney, secretary of the Associated Mutual Factory Fire Insurance companies of Boston. Among those who saw the test were the following named: Edward Atkinson, president of the Boston Manufacturers' Mutual Fire Insurance company, J. P. Gray, vice president of the same; R. W. Toppan, president of the Arkwright Insurance company of Boston; D. W. Bartlett, secretary of the same; Congressman William C. Lovering, treasurer of the Whittendon Manufacturing company, of Taunton, and vice president of the American Cotton company; Frank Hart of the New York office of the

American Cotton company; General Manager R. Fiske and Engineer Watson E. Holmes of the Planters' Compress company of New York; Thomas J. Borden, president of the Fall River State Mutual Fire Insurance company; B. F. Taft, secretary of the Cotton and Woolen Insurance company of Boston; J. E. Cabot, manager of the Inspection Bureau of the New England Stock Underwriters' association; A. L. Goodale, treasurer of the Boston Manufacturing company of Waltham; Charles B. Amoy, of Boston, treasurer of the Hamilton mills, also agents Southworth, Pead, Thomas and Moulton and superintendents Rawlinson and Childs of the Lowell mills.

Formerly all cotton was square bales but lately the method has been considered a failure because of the fact that when once on fire the quantities of air pressed in with the cotton permitted the fire to burrow inward, causing almost a total loss. Under the new systems it is claimed that the danger from burrowing is reduced to a minimum by the expulsion of the air in the process of baling.

She — "I can't bear a tandem."

He — "Why, don't you like to have a man tagging after you?"

She — "Yes, but he never catches up."

SLIGHTING A DUTY.

"You haven't made things look very neat and orderly here in the back shop," said a merchant to a young clerk.

"Well, I thought it was good enough for back there where things cannot be seen very plainly, and where customers seldom go."

"That won't do," said the merchant sharply, and then added in a kinder tone: "You must get ideas of that kind out of your head, my boy, if you hope to succeed in life. That kind of 'good enough' isn't much better than 'bad enough.'"

And the merchant made the boy go and do all the cleaning over again.

Margaret Nason, a bright Indian girl of the Sitting Bull tribe, who came east from her native home some ten years ago, and received an education at the Lincoln Institute, has returned to the lands of her fathers. She is the only Indian girl graduate of the Girls' High School of Philadelphia, where she was a most proficient student in history and languages. During her post-graduate work, Miss Nason took an advanced course in English, while she imparted the Indian tongue to her instructors.

GEORGE W. HAMBLET, Telephone Connection.

Successor to Dustin Machine Co.

Engineers and Machinists

Paper Cutters, Special Machinery Built, General Jobbing,
Pulleys, Shafting, Gearing, etc.

30 ISLAND STREET, - - LAWRENCE, MASS.

SUITS TO ORDER $12.50 Semi-Annual Sale.



For the information of any who are not acquainted with our semi-annual mark down sales we shall offer a few words of explanation.

The goods in question are the remains of our Spring $16, $18, $20, and $22 Suitings, some of which are suitable for the whole winter. There is scarcely a pattern that is not suitable for the whole fall.

You are to be offered no cheapened workmanship or trimmings on this occasion; the reduction is in price only.

All suits will be cut and made by the same cutters and tailors as when the garments were former prices.

One other thing is to be continued, namely: free pressing and repairing of mark-down suits.

The sale continues until about **August 15th**; the time to order is now, while the stock is whole.

E. B. BRADY & CO., Tailoring,

42 Central Street, Lowell, Mass.

LAMINAR FIBRE CO.

MANUFACTURERS OF

Roving Cans, Boxes, Trucks,

And all Forms of Mill Receptacles.

Office and Factory, Tannery Street, North Cambridge, Mass.

L. D. Telephone, Arlington, 44.

C. G. SARGENT'S SONS,

GRANITEVILLE, MASS.

Builders of Wool Washing Machines, Wool, Waste and Rag Dusters, Duplex Burr Pickers, Waste Cards, Etc.

Write for information concerning our

NEW AUTOMATIC COTTON DRYER.

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A Monthly Publication by Students of the Lowell Textile School, with papers and other valuable information by leading manufacturers.

FENWICK UMPLEBY, Business Manager.

PUBLISHED MONTHLY

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BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

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For Sale at all Newsdealers

Advertisements must be at the Journal Office before the fifteenth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

Patriotism runs high in Lowell.

. . .

The bicycle contest was not a success.

. . .

Lowell Textile School classes commence in October.

. . .

Fenwick Umpleby, during his sojourn in England, has already visited fifteen technical schools.

. . .

A. J. Pease, formerly with the Lowell Textile School, is designer for the Faulkner corporation, North Billerica.

There is more religion and more morality brought out by the popularizing of science than by any other means.

. . .

The man who spends his evenings in the saloon, as he reflects the next morning in his sober moments, looks back with shame.

. . .

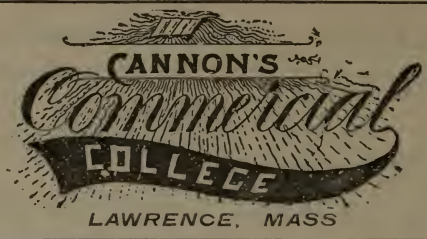
Mrs. Thomas E. Mitchell (nee Miss A. B. Marinal, stenographer at the Lowell Textile School) has gone to Charlestown to join her husband.

. . .

This great country will at no very distant period make such strides in the training of her work people as will enable her, by the united efforts of her own sons, to hold her own against the whole world.

. . .

We see many who, when a hinge of a door in their houses happens to have given way, or a board in the floor become loosened, bring home with them the necessary screws, nails, etc., and at once set about repairing, which is to be praised and commended, but, owing to the neglect in their earlier education, they know nothing of the house they live in, the body in which the Creator has placed the spirit with which he has endowed them, and for which He holds them responsible.



The man who has taken scientific lessons and studies during the week will not waste his leisure time in listless idleness and his evenings in carousing and drinking. He will learn that temperance in food and drink, cleanliness and proper exercise will double the value of his own life and those of his children.

. ' .

Today we have the kindergarten, trade schools, manual training schools technological institutions, commercial schools, weaving schools and textile colleges. In the schools enumerated the studies are, as their various names imply, of a real and practical character. Students learn not only how to make a drawing of a machine, but to make the working drawings from which a machine may be constructed, and in the manual and training and trade schools to make the objects from the drawings; in the weaving and textile schools to make the fabrics from the designs.

. ' .

It is, no doubt, a matter of great importance that in universities and technological institutions professional men have an opportunity of acquiring every kind of scientific instruction, but a task has in these days become one of urgent necessity, namely, that of providing for the rising generation and for the improvement of our present working and trading classes, not only the elementary knowledge offered in primary schools but also the amount of technical and scientific instruction which tradesmen now require in consequence of the increased competition among themselves and between tradesmen and manufacturers, as also in consequence of the improving taste of the people and the great improvement made in all the different branches of industry.

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WATER GLASS.

In 1640 Von Helmont discovered that when in the preparation of glass from sand and alkali an excess of alkali was used the glass dissolved in boiling water, but it was not until 1828 that water glass as now known was prepared and practically utilized by Von Fuchs, in stereochromy or solid color painting, in mural and monumental decoration, and for the preparation of various cements and artificial stones. Water glass, soluble glass, or silicate of soda, as it is variously called, possesses, when properly prepared, many unique and valuable properties. In cold water it is nearly insoluble, or dissolves very slowly. In boiling water it dissolves with facility and remains in solution when the latter has cooled. Water containing 30 per cent. of the glass in solution is of a sirupy consistence, and may be used as a transparent varnish on many substances; on drying it forms a glassy coating that resists moisture and change of temperature very well. It has been used extensively as a vehicle for certain pigments to form paints known as silica paints. These have the advantage over all paints or varnishes of being incombustible, and when used on woodwork serves in a measure to prevent sudden ignition of the wood by contact with flame. They are also serviceable in painting theatrical scenery, cloth saturated with a dilute water glass varnish becoming uninflammable. The pigments used in these paints are: zinc white, barytes, chrome green, chrome oxide, chrome red or orange, cobalt ultramarine, zinc yellow, ultramarine, cadmium sul-

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phide, ocher, etc. Chalk mixed with water glass forms on drying a very compact stone as hard as marble; bone ash, zinc white, and magnesia with water glass form similar stones. Ransome's artificial stone is prepared by mixing sand with water glass solution to form a plastic mass which is passed into the required shapes, then placed in solution of calcium chloride; silicate of calcium is formed and cements the grains together, the chloride of sodium formed at the same time being removed by washing with water.

In connection with clay, lime, sand, cement, etc., soluble glass enters largely into the composition of many of the patented artificial stones, plastic tiles, slates, etc.

The detergent properties of water glass make it an excellent scouring material, and it enters largely into the composition of most of our common soaps.

Water glass is best prepared by melting together in a crucible powdered quartz sand and carbonate of soda. Usually a small quantity of charcoal is introduced, but if the materials used are free from metallic oxides and compounds this in unnecessary.

Fine infusorial earth is nearly pure silica, and makes excellent water glass. Where quartz or sand is employed it is reduced by grinding together with the calcined soda to a powder, the whole of which will pass through an eighty-mesh wire-gauze sieve.

The following are the usual proportions in which the materials are mixed:

1.	Clear quartz	45 lbs.
	Carbonate of soda, calcined	23 lbs.
	Charcoal	3 lbs.
2.	Quartz sand	100 lbs.
	Calcined soda	48 lbs.
	Charcoal	5 lbs.
3.	Quartz sand, purified	65 lbs.
	Anhydrous carbonate of soda	34 lbs.
	Powdered charcoal	4 lbs.

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The ingredients, thoroughly mixed, are put into clay pots and gradually heated to bright redness; carbonic acid and oxide escape, and the mass gradually becomes liquefied. When effervescence ceases and fusion is complete, the contents of the pots are poured out on clean stone slabs to cool. When made of good materials and properly fused the glass closely resembles ordinary flint glass.

Cold water scarcely dissolves it at all, but if broken into small pieces and boiled in soft water it gradually dissolves. If the boiling is continued some time and a sufficent quantity of glass is added, a clear sirupy liquid or a nearly colorless jelly, according to circumstances, is obtained. These solutions may be diluted with hot water.

The solution containing about 30 per cent. of the glass is in greatest demand. It is quoted at fifty cents per gallon, put up in barrels or kegs.

TEDDY'S TUTOR, THOMAS TINKLER.

Thomas Tinkler, Teddy's tutor,
Tried to teach Ted tactfully,
Trifling Teddy thought too tiresome
Tutor Tinkler's tendency.

Therefore Teddy, tempting trouble,
Tried to thwart the tutor's tact;
Turned to taking truant trudges,
Till T. Tinkler Teddy tracked.

Tutor threatened, truant trembled,
Then to tardy tasks turned they.
Thanks to tutelary tyrant,
Teddy's talents tell to-day.

—Harper's Round Table.

EVENING WEAVING GRADUATION CLASS.

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BUSINESS HINTS.

To bear is to conquer our fate. —Campbell.

. . .

I'll make assurance doubly sure and take a bond of fate.—Shakespeare.

. . .

Cultivate an even temper. Many a man has fallen dead in a fit of passion.

. . .

I think sculpture and painting have an effect to teach us manners and abolish hurry.—Emerson.

. . .

The more out-door air and cheery sunshine a person can use the longer he will live.

. . .

A man who is willing to be helped out of the mire, and then is unwilling to help others, is no man at all—he is a thing.

The discovery of a new dish is more beneficial to humanity than the discovery of a new star.—Brillat-Savarin.

. . .

Men are some times masters of their fates;
The fault, dear Brutus, is not in our stars,
But in ourselves, that we are underlings.
—Shakespeare.

. . .

I believe neither in idols nor demons. I put my sole trust in my own strength of body and soul. — Motto of an old Norseman.

. . .

The chamber where the good man meets his fate
Is privileged beyond the common walk
Of virtuous life, quite in the verge of heaven. —Young.

. . .

When you have placed your standard high, and your only dread is the fear of committing a cowardly act, you will be delivered from all lower fears.

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A somewhat varied experience of men has led me, the longer I live, to set the less value on mere cleverness; to attach more and more importance to industry and physical endurance.—Huxley.

. . .

Never mind others' ingratitude. Shine on, O, noble soul. "It never troubles the sun that some of its rays fall wide and vain into ungrateful space and only a small part on the reflecting planet."

. . .

The world generally gives its admiration, not to the man who does what nobody else ever attempts to do, but to the man who does best what multitudes do well. —Macaulay.

. . .

Timidity is a disease of the mind, obstinate and fatal; for a man once persuaded that any impediment is insuperable, has given it, with respect to himself, that strength and weight which it had not before.—Dr. Johnson.

. . .

Insist on yourself; never imitate. Your own gift you can present every moment with the cumulative force of a whole life's cultivation; but of the adopted talent of another, you have only an extemporaneous half-possession. That which each can do best none but his Maker can teach him.

. . .

OPPORTUNITY

The stârs that rise to-morrow
May set in endless sorrow;
To-day do thine endeavor,
Or dare to fail forever.

. . .

Whatever your sex or position, life is a battle in which you are to show your pluck; and woe be to the coward. Despair and postponement are cowardice and defeat. Men are born to succeed, not to fail.—Thoreau.

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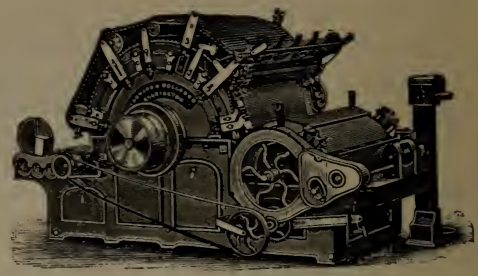
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UNDERSTAND
the merits and you will be convinced beyond a doubt of their superiority.
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Listen to the remarks of customers, analyze their criticisms, weigh their praises, cull their comments, study closely their faces as the goods are being shown them. In a thousand ways they may say or look something that would give a relish to your advertisement if skilfully woven into it.

. . .

Whether a boy is from farm or city, rich or poor, weak or strong, talented or not, will and work are sure to win. Wishes fail but wills prevail; labor is luck.—Wilbur F. Crafts.

. . .

Beware of the man who is always amiable, always sympathetic, always admiring, always "the same;" one hand is already in your pocket and the other at your throat.

This is courage indeed; to look into a dull future and smile; to stay bound and not chafe under the cords; to endure pain and keep the cheer of health; to see hopes fade and die out and not sink into brutish despair—here is courage before which we may pause with reverence and admiration.—Munger.

Now the whole cube that I take
Into halves I quickly break;
Halves to quarters now divide,
One, two, three, four, side by side!
Then the quarters I will take
And to eighths so quickly break,
Who'd have thought one cube could hide
Eight small cubes so well inside?
Now the eight small cubes I take
And the large cube quickly make!
Eighths and fourths and halves once more,
Then the whole cube as before.

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SWING DAT WHITEWASH BRUSH!

Gen'ral Miles done queered dat beef,
Swing dat whitewash brush!
Tol' him so right to his tee'f,
Swing dat whitewash brush!
Alger am an angel boy;
Eagan am his country's joy,
Pure as gold wifout alloy—
Swing that whitewash brush!

Gen'ral Alger he's all right,
Swing dat whitewash brush!
Knocked dem Spinyards out of sight,
Swing dat whitewash brush!
He's de boy dat won de mill;
Goo'ness! how dat man can kill!
All dem Spinyards runnin' still,
Swing dat whitewash brush!

Gen'ral Alger—lovely man!
Swing dat whitewash brush!
Bes' in all of Mishygan,
Swing dat whitewash brush!
Sent dem sojers plum presarve,
Pills an' tonics fo' dah narves—
Give him jus' what he desarves,
Swing dat whitewash brush!

Gen'ral Miles, yo' bes' tu'n pale,
Swing dat whitewash brush!
Give yo' jus' ten months in jail,
Swing dat whitewash brush!
Yo' put borax in dat beef,
Brought dem sojer men to grief—
Deeds you done am pas' belief!
Swing dat whitewash brush!

Gen'ral Miles—dat man am bad!
Swing that whitewash brush!
'Bout de worst we's ever had,
Swing dat whitewash brush!
Went to Cuba—what he do?
Toted down dat borax stew,
Made the sojers eat it, too!
Swing dat whitewash brush!

Gen'ral Eagan—angel child!
Swing dat whitewash brush!
Language beautiful an' mild,
Swing dat whitewash brush!
Stayed at home till war was through;
Went to church an' bought a pew—
Dat's what Gen'ral Eagan do!
Swing dat whitewash brush!

Glad it's settled now all right,
Swing dat whitewash brush!
Certain, now, who won the fight,
Swing that whitewash brush!
Alger—Sunday school for yo'!
Eagan—take de bes' front pew!
Miles—yo' made dat borax stew!
Swing dat whitewash brush!

Hobart, in the Baltimore American.

WARREN L. FLOYD,
- - Architect - -
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52 Palmer Street, - - Lowell, Mass.

A REMARKABLE FAMILY.

The lad was only about four feet high, but he had a coonskin cap and a pair of rawhide boots which looked as if they had been made to order for a giant. The man who was touring through the neighborhood, on government business bent, stopped his horse at the log house to make some inquiries as to the roads. He introduced the conversation with the patronizing inquiry:

"What is your name, my little man?"

The boy looked up at him with stern gravity and answered;

"Doctor Hawkins."

"Why, how long have you been a doctor?"

After some moments of mental calculation the boy replied:

"About 14 years."

"Are you the head of the family?"

"No, I reckon you'd call General Hawkins the head of the family. He keeps store down in the gap. Though Baron Hawkins—he's the brother between General and me—helps a lot. He's mighty good to maw, Baron is."

"Are there any more distinguished people in your family?" said the astonished stranger.

"Well, I dunno as they're so 'nation distinguished. But there's Admiral Hawkins and Perfessor Hawkins in the house now."

"They—they are spending a little time at home, are they?"

"Yep. They've got to. They ain't big enough to go to work yet. Admiral's only four years old and Perfess is just cutting his teeth."

"What's your father's name?"

"Paw? His name's Jim. You see he 'lowed he wasn't going to let his boys go through life without the advantages he had been deprived of himself. But at the same time he wasn't going to give up no money to the colleges. So

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516 Middesex, Cor. Howard St., Lowell.

he took time by the forelock and give us our names when we was baptized, which I reckon is about as bindin' and lawful as anything you could fix up. Paw's about the most prudentest man in the whole country, paw is.

NEW COLORS.

As a matter of fact, there are no new colors. But this is begging the question, says the Philadelphia Times, for there are many new shades and tints. Unfortunately, many of the names given to the new variations in color each season are arbitrary distinctions meaninglessly in themselves, and it is not easily possible for any one to learn and remember them all, inasmuch as in silks alone there are more than 150 distinct tones; in wools just as many, and so on.

Since, however, many fashion advices refer to the new shades by name, without further description, it is useful to know some of the more popular shades and tints by name. Safre, for instance, is a gray-blue; Seville, deep cardinal red; Myosotis, turquoise blue; Ninon de L'Enclos, an azure blue; Ch. Lebrun, tan; Corneille, purple; Pompon and Matator, two reds; Paille, a pale yellow; Azalee, reddish purple; Hycine, pinkish mauve; de Sevigne, gray; Pampas, Corail and Lotus are new pinks; Pavot, Coquelicot, Reine and Roi are new reds, and so on one might continue.

But, after all, these names are much more for the benefit of dealers than the individual shopper, and one can be attractively gowned in an exquisite shade of mauve organdie, without knowing or caring whether it is called by the manufacturer Velantine, Clematite, Iris or Valubilis, or something else.

H. H. WILDER & CO.,
Furnaces, Stoves, Ranges, Kitchen Furnishing Goods
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Leland Belting Co.,
Broadway, Corner Lowell St.,
LAWRENCE, MASS.

SPRINKLERS IN NEXT WORLD.

Some time ago Mr. Atkinson was speaking before the New England Cotton Manufacturers' Association on the topic: "Are Automatic Sprinklers a Necessity in the Dust Flues from Pickers?"

Mr. Atkinson, in his charactistic style said, "when you find a factory, where sprinklers are not needed, put them in."

A man who interrupted at this moment said: "Why, then you would have to use them all over the universe."

"Yes," said Mr. Atkinson, "I have even been advised to take them into the next world with me."

First Steamship Passenger — Do you know what they had for breakfast this morning?

Second Steamship Passenger — No. I gave it up long ago.

There is an ancient rhyme which gives good advice in regard to the color chosen for the bridal gown:

"Married in white,
You have chosen all right.
Married in gray,
You will go far away.
Married in black,
You will wish yourself back.
Married in red,
You'd better be dead.
Married in green,
Ashamed to be seen.
Married in blue,
You'll always be true.
Married in pearl,
You'll live in a whirl.
Married in yellow,
Ashamed of the fellow.
Married in brown,
You'll live out of town.
Married in pink,
Your spirits will sink."

Haffan Haff—Dere's one t'ing I like about dis salt water, Docksie.

Docksie Ratz — What 's dat?

Haffan Haff — 'Tain't fit to drink.

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BLEACHING WOOL.

The following is a new French method of bleaching wool: First, 100 kilogrammes (220½ pounds) wool are washed cold in a solution of 20 kilogrammes (44 pounds) carbonate of soda in 2,000 liters (528⅓ gallons) water. The wool is left in this solution for 45 minutes, and then allowed to drip off. It is then dried, rinsed in clean water, and whizzed twice. In the second operation, the wool is passed for five minutes through a bath containing 200 liters (211⅓ quarts) mineral oil or petroleum ether for each 100 kilogrammes wool. The wool is then washed in clean water, left to drip, and dried in open air with an energetic circulation. The inventor claims that the wool is bleached nicely by this method, and that the oil can be used again.

THE REASON.

I know a little maiden who is always in a hurry.
She races through her breakfast to be in time for school;
She scribbles at her desk in a hasty sort of flurry,
And comes home in a whirl that fills the vestibule.

She hurries through her studying, she hurries through her sewing,
Like an engine at high pressure, as if leisure were a crime;
She's always in a scramble, no matter where she's going,
And yet—would you believe it?—she never is in time!

It seems a contradiction, until you know the reason;
But I'm sure you'll think it simple, as I do, when I state
That she never has been known to begin a thing in season,
And she's always in a hurry, because she starts too late.

F. W. PARK,

OPTICIAN,

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Stationery, Confectionery, Bags, Toys, Etc.,
8 CENTRAL STREET, LOWELL.

Lowell Textile Journal.

RAW SILK AND SILK YARNS.

By W. T. HALL.

Pure silk is entirely different from the vegetable fibres and wool by being devoid of cellular structure. It consists of the fibre which the silk-worm spins around itself when entering the chrysalis state.

The eggs of the European silk-moth are about the size of poppy seeds, and one gramme weight of them contains about 1,350 eggs.

When the silk-worm first begins to spin, it throws around itself a light scaffolding of short fibres connecting the neighboring points of support. When this has been completed its movements become slower, and by moving its head from side to side it gradually forms its dwelling. Towards the interior the layers become firmer, while the one which is next the insect is a thin parchment-like skin. The fibre is double, varying in length 350 to 1,250 metres. About three weeks after spinning, the silk-moth emits a pecular kind of saliva which softens one end of the cocoon and in this way it gets out. The good silk is obtained from cocoons in which the insects have been killed either by being heated in an oven or by means of steam. After killing, the cocoons are sorted and the best are kept for organzine or warp.

In the reeling process a number of cocoons are thrown in a basin of warm water so as to soften the gummy envelope of the fibres, thus permitting their ready separation from the cocoons. Before the reeled silk, or raw silk, is used for weaving, two or more threads of the raw silk are thrown together and slightly twisted by the silk spinner or throwster, and in this way the various qualities of organzine, tram or embroidery sewing silks are produced. Waste silk comes from perforated and double cocoons, and such as are soiled in steaming, and any that are unable to yield a continuous thread. All such waste silk is washed and boiled with soap, and dyed. This is afterwards carded and spun like

cotton, and yields the so-called "Spun Silk." The number of cocoons or ends of silk put together in the reeling determines the size or thickness of a thread. The finest size commercially used is 9 or 10 denier; over 40 denier the silk is very common and foul or shabby. The weight is determined by making a hank of silk with 400 bouts, or revolutions, equalling in total lengths 520 English yards; the size being called according to the weight of this.

There are generally three ranges in good silks, thus, $\frac{9}{11}$, $\frac{10}{12}$, $\frac{11}{13}$, etc., or more in commoner and coarser silks, such as, $\frac{14}{18}$, $\frac{16}{20}$, $\frac{26}{30}$, etc. In organzine or tram the silk is classed by drams to the 1,000 yards, thus: "$2\frac{1}{2}$ drams," means that each 1,000 yards weighs $2\frac{1}{2}$ drams.

Silk has always been known from very early times. The chief centres for it are China, Japan and Italy, the bulk of it being white, but some kinds are yellow. The silk from China is done up in bundles called in England, "books" weighing about 102 lbs. per bale. In China it is made under native supervision and is generally more or less faulty, but during late years filatures have been erected, where the cocoons are reeled under European supervision, with the result that a thread equal to the best Italian silk is now obtained. Filature means reeling by steam power. One of the most noticeable features of China silk is its whiteness. There are also other kinds of silk in China, such as Canton, of which there are several crops in a year, but it is of an inferior color. Shanghai is the chief market for the export of Chinese silk. Japan is also a very large producer, and the introduction of filatures into this country has greatly improved the productions. The result of the introduction of steam filatures and Europeen supervision is that a very even thread is produced, and a great saving of waste and expense is made in winding. These points have been taken advantage of by the Americans, who have fully realized the saving and cost of working.

India, too, produces a lot of silk, the color being chiefly yellow, but being worked by Europeen capital and supervision, is of a good class. In this country there are three crops in a year, called, "bands;" the best being the November band, March coming second and July third, which is called the "rainy band." This conntry also does a large business with Tussah silk, *i. e.*, wild silk made by the silkworms in a wild state. This has been greatly improved and rendered into a remarkable article by

the introduction of filatures.

Silk is also grown in Syria, France and Spain, but Italy easily ranks first, having Milan for its chief market. Messina also produces some silk. Silk always ranks highest in price when made under European supervision, on account of its superior quality.

London was at one time the chief depot for supplying the Continent of America with the raw material, but the opening of the Suez Canal has altered all this. Asiatic silk now goes to the Continent via. Marseilles, while the American supply is sent from China and Japan via. San Francisco; consequently, the port of London in regard to the silk trade has greatly depreciated. England was at one time the centre of the thrown silk trade, and supplied nearly all the Continent, but the taking off of the duties in 1860 altered this, so that now the Continent makes its own thrown silk, and in fact sends a great deal into England. Before the duties were taken off the import of manufactured silk goods from abroad was about £2,000,000; now it is computed to be £20,000,000 sterling, having regard to the present prevailing prices. From various causes the Germans seem to have proved themselves better dyers than the English, especially in the weighting of the silk, which they are able to do up to as high as 400 per cent. with little or no detriment to the silk, and giving greater beauty and brightness

English firms now send a lot of their work to be dyed in Germany.

The ruling prices have greatly fallen in recent years, partly from cheapened freight and quickness in transit, also in the great depreciation in exchange between England and the east.

The process of working the silk is as follows: The silk is first sorted or sized according to the different silks. Many of the sorts have to be soaked at first to improve their winding properties, after which they are wound, cleaned and made into organzine or weft.

The organzine is used for warp purposes, and is formed by spinning one thread a particular number of turns to the inch, then doubling two threads together and throwing them rather a less number of turns back again. This enables the silk to be worked into the warp after boiling out and dying.

Tram is made of two or more ends slightly twisted together about three turns to the inch, and is used as weft.

There is a very considerable quanity of waste in preparing the silk which finds a market as "Spun

Silk," from which many beautiful articles are made. Lord Masham was the inventor of much valuable machinery to produce this result.

During recent years, by the aid of chemistry, great attempts have been made to find a substitute for silk. To a certain extent it has been successful, and a remarkable article has been produced.

Wool in conjunction with chemicals, has been the material used in the production of this article, but that at present to be obtained is highly inflammable, which is much against its general use.

There are two other substitutes which are being tried. Ramie fibre grown in Germany, and China grass grown in China, both of which are a coarse grass about 4 feet high, and which, by chemical treatment, have been turned into a thread which has almost the same lustre as silk. These and Mercerized cotton will probably be the coming substitute for silk.

STERILIZING WATER.

A process for successfully avoiding any undesirable features or qualities imparted by the usual method of sterilization has been brought to the attention of the French Academy of Science by M. Duclaux, the eminent chemist, the principle thus explained consisting in subjecting the liquid thus to be sterilized to the desired temperature in a closed vessel, under a high pressure and away from contact with air; the apparatus used for this purpose is about equally simple, the sterilizer consisting of a steel tube, silvered within and surrounded by a stream or water jacket formed of a second cylinder of slightly larger dimensions, suitable connections and stop cocks being provided as well as the thermometers and pressure gauges, and the mechanism so mounted as to be revolved by the turning of a crank. Some information on this matter by Prof. Bilslik, communicated to the Popular Science News is in point, namely, that water may be sterilized in five minutes by adding to it bromine, and that bromine may be then neutralized by adding ammonia. The river water of Berlin, it is stated, has been tested two hundred times, and after being treated with bromine and ammonia, all germs of disease were distroyed, including those of typhoid and cholera. In thus sterilizing a gallon of water, there are first added three drops of a solution of 100 parts water, 20 parts bromine, 10 parts potassium bromine, adding, after five minutes, three drops of a 9 per cent. solution of ammonia.

SIMPLE LESSONS IN PHOTOGRAPHY.

CARBON PRINTING.

Carbon or pigment printing differs from all photographic printing processes in that the image is a non-metallic one, and yet there is little question that it is as permanent as any other process, even that by platinum; while of the artistic qualities of the proofs it is a truism to assert that they are quite unexcelled; yet, although carbon printing is so admirably distinguished, amateur workers seldom adopt it, because, we suppose, of its "difficulties." The beginner, however, may be assured those difficulties relatively to others are almost of a fanciful description, and we shall, therefore, briefly outline the process, inasmuch as a hand-book for photographic beginners would be incomplete without it.

Carbon printing has its *raison-d'etre* in the fact that a film of gelatine heated with an alkoline bichromate, dried and exposed to light, is insoluble in warm water. The gelatine is usually first mixed with powdered charcoal and alizarine, and then sensitized. The printing is conducted in the frame as usual, and the negative has a narrow strip of blackened paper gummed all around its edges, the object of which will presently appear.

Inasmuch as no visible impression is made on the sensitized gelatine (or tissue, as it is called), the printing may appear difficult, but in reality it is not so. An actinometer of a simple kind, which we have long used, materially assists the operation. This is a piece of ordinary albumenized silver paper, which is placed in the light under a negative simultaneously with the frame containing the negative and the tissue. The time of exposure for the latter is about one-third of the former paper, so that when this is fully printed the carbon tissue will also be about rightly exposed.

To develop the tissue, and in order to obtain a non-reversed picture, it must, first of all, be attached to what is known as a temporary support. This may be a slightly roughened zinc or glass plate, smeared with a little wax and resin dissolved in turpentine, the excess of which is rubbed off with a clean rag. To attach the print to this support im-merse it first of all in a dish of cold water; in a short time

it will absorb sufficient moisture to make it adhere firmly. It will first curl inwards, and then in an opposite direction. Just before it becomes flat the plate is slipped under the water, the gelatine side of the tissue pressed closely against it, and the whole drawn out in a way so as to avoid the formation of air-bubbles, and the print "squeegeed" on to the temporary support.

The plate with the picture attached is next placed in a dish of water heated to about 90 degs. F., and allowed to remain there until the water begins to color. If a corner of the paper "backing" be lifted up, it will leave the gelatine film on the plate, which is next replaced in the warm water, when the soluble gelatine and the pigment mixed with it—that is, the parts not acted on by light—will dissolve away and the picture is left visible. The image is finally rinsed in cold water, which removes free particles of pigment and "sets" the gelatine.

The picture is now transferred to its final support, which consists of paper coated with a thin layer of hardened gelatine. A piece of this paper slightly larger than the print is placed in warm water for a minute or two, and then laid on the image and squeegeed down. When the paper is dry it is stripped from the plate, when the picture leaves its "temporary support" and will be seen to be attached to the gelatinized paper.

The above is what is called the "double transfer" process, but the gelatine picture can be attached to its permanent support without employing a temporary one; in this case, however, it is necessary to print from a reversed negative—that is, one in which left and right change places,—and which has to be made specially for the purpose. The advantages and disadvantages of the respective processes will, therefore, be seen to be about equally balanced.

TO REMOVE RUST.

To remove rust from iron or steel utensils the following solution is applied by means of a brush, after having removed any grease by rubbing with a clean dry cloth: 100 gm. stannic chloride are dissolved in one liter of water; this solution is next added to one containing 2-5 gm. tartaric acid dissolved in one liter of water, and, finally, added 20 c. c. indigo solution diluted with two liters of water. After allowing the solution to act for a few seconds, it is rubbed clean with first a moist cloth, later with a dry cloth; to restore the polish, use is made of silver sand and jewelers' rouge.

WOOL SCOURING.

By I. WILSON.

First of all, it is of the utmost importance that the water used for preparing or cleansing textile fabrics should have special consideration, and unless water for wool scouring is either soft or be softened, considerable damage may be done in the preparation of the cloth; besides, needless expense will be incured.

When an excess of carbonic acid is present in water, it takes up from the earth lime, with which it comes in contact, and forms bicarbonite of lime in solution, that is to say, two parts of carbonic acid gas combine with one part of lime, and this produces what is called temporary hardness.

There are two ways of softening water: either in a separate vessel, or in the tank from which the supply is drawn.

Caustic soda softens water by precipitating both the carbonate and sulphate of lime, rendering them insoluble. Soda crystals and pure alkali work slowly on hard water, and a large quantity is required, besides heat, in order to be effective, whereas one pound of caustic soda will do as much work as ten pounds of soda crystals, and without any heat being required. It is therefore cheaper to use caustic soda than any other article for softening water. The exact quantity of caustic soda required for softening water can be ascertained in individual cases, but the following general directions are sufficiently accurate.

To water of medium hardness add 2 pounds of caustic soda to each 1,000 gallons of water. To very hard water add 3 or 4 pounds of caustic soda to each 1,000 gallons of water. The caustic soda simply requires to be thrown into the water tank when full, in the quantities I have given. It dissolves instantly, and the water only requires to be stired once or twice to mix the caustic soda "through" and throw down the lime. If the tank be left three or four hours undisturbed, the lime falls and settles to the bottom of the tank, and the clear softened water can be drawn off by placing the exit tap rather above the bottom of the tank, thus leaving the sediment behind.

The next important thing in wool-scouring is the soap, and I give two, viz: potash pearl ashes and potash soap.

First, pearl ashes is the purest form of potash, and it is safer and better than ordinary carbonate of potash.

Too often the latter is palmed off on consumers as pearl ashes; carbonate of potash, if held in the hand and a drop or two of water added, will give off heat; pearl ashes will not give off any heat; this is a sufficient guide to distinguish between pearl ashes and carbonate of potash, but in cases of doubt recourse should be had to analysis.

Second, potash soap is made from caustic potash and water combined with fatty matter, or, speaking more correctly, in soap you have to deal with an alkali and a fatty matter. The alkali and this substance enter into combination, and when this is complete you have a new product, viz: soap. Wool-washers find it to their advantage to make their own soap.

Next we come to the wool-scouring, which operation consists of removing the oily substance in the wool, which is called "yolk," and nearly one-half the weight of this yolk is potash. This yolk is capable of forming a soap with an alkali in the bowl, consisting largely of potash, no soda being present. Before, however, the wool can be used for spinning, this grease must be removed in such a way as the fibre of the wool be not injured, or its natural bright color destroyed. This is best accomplished by the use of a pure potash soap. The action of such a soap, which contains neither an excess of free or uncombined alkali, nor an excess of tallow, only removes the superfluous greasy matter adhering to the outside of the fibre, and leaves the fibre itself unimpaired. If, however, any chemical be used in conjunction with soap, the best results will be obtained with pearl ashes. The quantity of potash soap necessary for washing wool must depend on the quality and condition of the wool itself. Potash soap should be dissolved in the proportion of one pound to the gallon of water, and a portion added to the washing bowls as required. Refined pearl ashes should be dissolved in the proportion of one pound to the gallon of water, and a small quantity of this solution added from time to time in the first and second bowls.

I will take a scouring machine with three bowls; the bowls being primed thus:

First Bowl—Six gallons of liquid potash soap and pearl ashes combined.

Second Bowl—Three gallons of liquid potash soap and pearl ashes combined.

Third Bowl—Hot water.

After working for some time the first bowl is let off, and receives the suds from the second bowl with three gallons of liquid potash soap and pearl ashes; the second bowl receives the hot water from the third bowl with three gallons of potash soap and pearl ashes, and the third bowl is again filled with clean hot water. The real cleansing, it must be borne in mind, is after all performed in the first bowl, and strictest attention must be paid to this fact. If, however, the wool be very dirty, the proportions mentioned above may be increased all through the process of scouring. On no account should soda ash or soda crystals be used with potash soap, as this simply destroys the whole advantage claimed for potash soap.

Another important point is the temperature of the water. It should not be too hot. Hot water certainly washes more quickly, but it causes a greater loss in weight of the wool. Any temperature that the hand can not bear is too great, but dirty and very greasy wools require a greater heat than cleaner qualities.

Hot water also takes out the natural curl of the wool, and thus destroys its spinning properties. Many a bad spin is due to nothing but washing in too hot water.

And now, in conclusion, the object in scouring is not simply to remove the greasy product from the material, but also the dirt and other matter with which the wool may be covered. A wool thoroughly cleansed should be of a pure color, should handle soft and elastic, and produce a true thread. On the other hand, wool which is not properly scoured takes a streaky color; the dyes do not penetrate the fibres, but remain on the surface. Too much intelligence and skill can not be exercised on wool scouring, which is the first process of cloth manufacture.

IDLENESS.

Idleness is the burial of a living man—an idle person being so useless to any purpose of God and man that he is like one that is dead, unconcerned in the changes and necessities of the world; and he only lives to spend his time and eat the fruits of the earth, like a vermin or a wolf. When their time comes, they die and perish, and in the meantime do no good; they neither plough nor carry burdens; all that they do is either unprofitable or mischievous. Idleness, indeed, is the strictest prodigality in the world.—*Jeremy Taylor.*

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You are to be offered no cheapened workmanship or trimmings on this occasion; the reduction is in price only.

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EDITORIAL.

Andrew Carnegie has donated $50,000 to the Keighley Technical College.

. . .

There is going to be a very large attendance at the Lowell Textile School.

. . .

Prof. Fenwick Umpleby has returned after eight weeks' sojurn in Europe.

. . .

The textile schools of Europe do not compare with the Lowell Textile School.

The most elaborate work by textile school students is to be seen at Coventry, Eng.

. . .

To visit and inspect twenty-eight technical institutions in six weeks is no "easy work."

. . .

Prof. M. M. Buckley, of Halifax, Eng., will make a lecture tour in the United States.

. . .

Some of the most beautiful cities in Europe still keep to the old style of street transit,—busses, horse-cars or trams.

. . .

The finest technical school in the world is to be in Manchester, Eng. They are building a $5,000,000 school.

. . . .

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evening students of technical, manual and art schools, it will repay you to visit the museums of Germany, France and England.

. . .

How is it there has been so much talk about the carding and spinning departments of the Yorkshire College, Leeds, Eng.? When Prof. Umpleby visited the college last August the floors of the card-room were not laid, and there were no windows in the building.

NICKNAMES OF THE STATES.

Alabama, Cotton; Arkansas, Bear; California, Golden; Colorado, Centennial; Connecticut, Nutmeg, Freestone, Land of Steady Habits; Delaware, Diamond, The Blue Hen; Florida, Peninsular; Georgia, Empire of the South; Illinois, Prairie, Sucker; Indiana, Hoosier; Iowa, Hawkeye; Kansas, Garden of the West; Georgia, Corncracker; Kentucky, Bluegrass, Dark and Bloody Ground; Louisiana, Creole, Pelican; Main, Lumber, Pine Tree; Maryland, Old Line; Massachusetts, Baked Beans, Bay and Old Bay, Old Colony; Michigan, Lake, Wolverine; Minnesota, North Star, Gopher, Lake; Mississippi, Bayou; Missouri, Puke, Iron; Nebraska, Blackwater; Nevada, Silver, Sagebush; New Hampshire, Granite, Switzerland of America; New Jersey, Garden, Foreign (out of the Union); New York, Empire, Excelsior; North Carolina, Old North, Turpentine; Ohio, Buckeye; Oregon, Beaver, Webfoot Country; Pennsylvania, Keystone; Rhode Island, Little Rhody; South Carolina, Palmetto; Tennessee, Volunteer; Texas, Lone Star; Vermont, Green Mountain; Virginia, Mother of Presidents, Mother of States, Old Dominion, Ancient Dominion; West Virginia, Switzerland of America; Wisconsin, Badger.

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VISITORS ARE ALWAYS WELCOME.

TESTS WITH LIQUID AIR.

"A capful of wind" is an old sailor phrase, but it is likely soon to be relegated to the obsolete list by a "bucketful of air"—yes, air in buckets.

A milkcanful of liquid air was brought over from New York yesterday to Prof. Barker's laboratory at the University of Pennsylvania, and was ladled out, poured out, boiled, and everything else done with it that can be done with any liquid, except to freeze it.

And yet how cold it was! What would the reader think of 320 degrees below zero? That was the temperature of this new fluid, and yet it was not frozen. It would boil when a chunk of ice was thrown into it, because the ice was so warm that it raised the air to its boiling point. And what became of the ice? Why, it was frozen so hard in this liquid that when hit with a hammer its brittleness made it fly into very small fragments.

At 320 degrees below zero air liquefies and remains a liquid at barometric pressure the same as water. If raised above that temperature, as by standing open to the atmosphere, it evaporates, the evaporation tending to keep it cool, so that a tumblerful of the liquid would all evaporate in about half an hour.

It has for some years been known that air could be liquefied, and Prof. Dewar, of Glasgow succeeded in liquefying it, but at a cost, as he said, of about $2500 a quart. He produced his low temperature by a series of evaporations. Mr. Trinler's plan is different. He condenses air by a pressure of 2,000 pounds to the square inch by ordinary means. Then he sends it through a copper worm

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and through an opening the size of a fine needle. It expands as it issues from the orifice and cools very considerably. This cooled air springs up by another coil, which it cools down to a lower temperature, and its escaping air passes by a third coil which cools its air until the air runs out of this third coil in a liquid stream as large as the finger without any pressure at all, and that without any other source of cold but the expansion of the air itself.—*Philadelphia Ledger.*

THE JEWISH RACE.

On the subject of the distribution of the Jews some interesting figures on this subject are given in the current *Blackwood.* Out of some 9,000,000 Jews no less than 5,000,000 are found in Russia. The distribution of the race appears to be as follows: Russia, 5,000,000; East Europe, 1,500,000: West Europe, 1,000,000; America, 1,000,000; North Africa, 200,000; Palestine, 70,000; elsewhere, 230,000; total, 9,000,000.

The balance of 230,000 includes the Jews of Turkey proper, Persia, Egypt, Arabia and the scattered residents of South Africa, India, etc.

Outside Russia the congestion of Jews is now on the borders of the adjoining States. While in Romania there are 250,000 Jews, in Great Britian there are only 101,000, as follows: In London, 64,280; the Provinces, 33,070; Scotland, 2,060; Ireland, 1,779; total, 101,189. Out of these, according to Mr. De Haas, we have: British born, 20 per cent.; German, 7 per cent.; Dutch, 5 per cent.: Russo-Polish, 58 per cent; and others 10 per cent. From the statement to the Basle Congress we may judge that Russian persecution has doubled the number of English Jews, and much more than doubled the amount of Jewish poverty in London.

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PROF. TYNDALL'S GYMNASTICS.

Some great men have a weakness for what one might call stage effects, and sometimes it is obvious that the effects have entailed careful preparation beforehand, in order to bring them off. But I know of very few instances where great men have been caught at their preparations.

However, at one of the meetings of the British association, I heard a story told in this connection about the late Prof. Tyndall, which is well worth repeating. The scene of the story is laid in the lecture room of the Royal society on the morning of the day for one of the professor's lectures.

On the morning in question a certain Mr. B. who was engaged upon some chemical analysis, wanted to see Prof. Tyndall about it, and knowing that, as he was lecturing that evening, he would probably find the professor engaged in arranging his experiments for the evening, he went into the lecture room to look for him.

Prof. Tyndall was not preparing experiments when Mr. B. came in. He was engaged in vaulting on one hand backward and forward over the iron railing from behind which the lecturer delivers his lecture. Mr. B. was rather surprised, but supposed that Prof. Tyndall, being very hard worked, was glad to take a little exercise whenever and in whatever way he could.

Mr. B. happen to attend the lecture that evening, In the course of the lecture Prof. Tyndall was reading from a notebook, which he rested on the iron railing in front of him, when apparently by accident, he let the book drop.

Without a moment's hesitation the professor placed one hand on the railing, lightly vaulted over, picked up the book, and then

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lightly vaulted back again. The audience greeted the performance with loud applause.

Then Mr. B. understood that in the morning Prof. Tyndall had been preparing to sustain the popular reputation as an athlete which he had acquired from his Alpine exploits, and was not merely snatching what exercise he could get during a rare few minutes' leisure. —*To-day.*

LANGUAGE OF FLAGS.

To "strike the flag" is to lower the national colors in token of submission. Flags are used as the symbol of rank and command, says the School Journal, the officers using them being called flag officers. Such flags are square to distinguish them from other banners.

A "flag of truce" is a white flag displayed to an enemy to indicate a desire for a parley or consultation.

The white flag is the sign of peace. After a battle parties from both sides often go out to the field to rescue the wounded or bury the dead under the protection of a white flag.

The red flag is a sign of defiance and is often used by revolutionists. In our service it is the mark of danger and shows a vessel to be receiving or discharging her powder.

The black flag is the sign of piracy. The yellow flag shows a vessel to be at quarantine and is the sign of contagious disease. A A flag at half mast means mourning. Fishing and other vessels return with a flag at half mast to announce the loss or death of some of the men. Dipping a flag is lowering it slightly and then hoisting it again to salute a vessel or fort.

If the president of the United States goes afloat, the American flag is carried in the bows of his barge or hoisted at the main of the vessel on board of which he is.

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THE RAREST COINS AND STAMPS.

The coin in question is a 20-stater gold piece of Eukratides, King of Bactria. It was obtained in the Punjaub, sold to Rollin & Feuardent, of Paris, for $4,000, and by them transfered to the French National Library for the sum of $7,000, of which Emperor Napoleon III paid one-half.

The 5-guinea piece of Charles I of England was given by him to Bishop Juxon, who attended him to the scaffold just before his execution. This coin was recently sold at auction in London, and brought $3,850. Other rare English coins are the Petition crowns, engraved by Simons, fine specimens of which bring $1,500. Germany, Poland and Switzerland have numerous coins which sell from $500 to $1,000. United States silver dollars of 1804 bring from $500 to $1,000, and numerous others from $100 to $500.

The rarest postage stamps are undoubtedly the one and two penny Mauritius, a pair of which are at present offered for sale by Jos. N. Gottendorf, of Paris, for the modest sum of $10,400.

A ten-cent Baltimore stamp, recently found at Louisville, Ky, was bought by Mr. Castle for $4,400. The Brattleboro, Millbury, St. Louis and New Haven stamps from $100 to $500, also numerous Confederate locals bring about the same prices.

During the work of removing certain remains in Cardiff churchyard a skeleton was found, on the feet of which was a new pair of hobnailed boots, and having a pipe in its mouth, and a corked bottle of grog under one arm—surely an exceptional way of being placed in one's last earthly resting-place.

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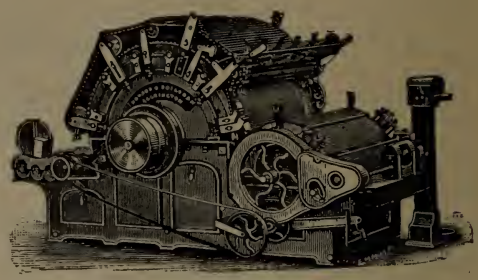
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SCHOOL BLUNDERS.

A teacher in a public school gave out a list of words to be defined and put in sentences. Among them was the word "chasm."

A little girl looked in the dictionary, and not being quite satisfied, inquired if "chasm" meant "gap."

The teacher absently replied yes, but was astonished when she presented her paper with this sentence: "When I am sleepy I always 'chasm.'"

But this is hardly equal to another teacher's experience in a little district school some years ago. She gave out words for analysis. "Bank-note" was one of them, and the teacher's astonishment may be imagined when one young lady brought the following unique analysis: "Bank-note is a compound primitive word, composed of 'bank' and 'note.' Bank is a simple word, meaning the side of a stream; 'note,' to set down. 'Bank-note,' to set down by the side of a stream."—*Youth's Companion.*

CHINA'S SACRED NUMBER.

Five is the great sacred Chinese number. There are five virtues, five colours—yellow, white, green, red and black—five household gods, five planets—Saturn, Venus, Jupiter, Mars, Mercury—five ranks of nobility, five tastes, five cardinal points—the middle, east, west, south and north respectively—and five zones.

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When quite young at school Daniel Webster was one day guilty of violation of the rules. He was detected in the act and called up by the teacher for punishment. His hand happened to be very dirty. "Give me your hand, sir," said the teacher, sternly. Out went the right hand. The teacher looked at it a moment and said, "Daniel, if you will find another hand in this school-room as filthy as that I will let you off this time." Instantly from behind his back came the left hand. "Here it is, sir," was the ready reply. "That will do this time," said the teacher; "you may take your seat."

Enthusiasm is the genius of sincerity, and truth accomplishes no victories without it.—*Bulwer Lytton.*

It is what one does, as much as what he knows, that brings success.

The talent of success is nothing more than doing what you can do well without a thought of fame.—*Longfellow.*

Rest satisfied with doing well, and leave others to talk of you as they please.—*Pythagoras.*

Every once in a while the African mind will evolve an expression that has a wealth of grotesque poesy in it.

An elderly man who is employed about one of the public buildings in this city was heard to remark:

"I dunno what I'se guine to do for close foh all ob my family."

"Have you a very large family, uncle?" said one of the clerks, in a quizzical tone.

"Deed I is—seben chillen."

"Are they all the same color as you?"

"No, sah; dey varies, rangin' all the way f'om dusk ter midnight."

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BIOGRAPHY.

John Greenleaf Whittier, the author and poet, was born at Haverhill, Mass., in 1807. His parents were members of the Society of Friends.

Whittier worked on a farm and at the trade of shoemaking until eighteen years of age. After that he studied for two years in the Haverhill Academy.

In 1829, he became the editor of a paper in Boston; and since that time had been engaged in various kinds of literary work.

His poems are of a vigorous and picturesque order, and the adaptation of form to thought, as well as the lofty purity and simplicity of his style, has procured for his writings a host of readers on both sides of the Atlantic.

Among his best known works may be mentioned the following: "Voice of Freedom," "Songs of Labor," "Home Ballads," "Snow Bound" and "Among the Hills."

A ROMANCE OF FORTUNE MAKING.

The romance of fortune making has just been strongly illustrated in the case of the late Mr. C. W. Lea, one of the proprietors of Lea and Perrin's sauce, who died worth $5,280,000, while his partner, who died some time before him, was equally wealthy. It seems that when young men they were in partnership as chemists in a very small way indeed, in Worcester. The late Lord Sandys casually gave them a recipe for sauce which, he had obtained in India, but which he had no idea was of any great money value. The young chemists allowed it to lie idly by for a few years, when it occured to one of them that they might make up a few samples of it. From that moment their fortunes were made.

Teacher — Why did the Normans and Saxons fight at Hastings? Pupil — That 's where they happened to meet, ma'am.

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FRANKLIN'S SIMPLE LANGUAGE.

Tradition has it that when Benjamin Franklin was a lad, he began to study philosophy, and soon began applying technical names to common objects. One evening when he mentioned to his father that he had swallowed some "acephalous mollusks," the old man was much alarmed, and suddenly seizing him, called loudly for help. Mrs. Franklin came with warm water, and the hired man rushed in with the garden pump. They forced half a gallon down Benjamin's throat, then held him by the heels over the edge of the porch and shook him, while the old man said: "If we don't get them things out of Benny he will be pizened, sure" When they were out, and Benjamin explained that the articles eaten were oysters, he received a whipping for frightening his parents. He then formed a resolution to ever afterward convey his thoughts in the simplest language possible.

NOT WITH WATER, THOUGH.

"I gave that poor man a dollar a few days ago and told him to come around and let me know how he got along."

"Oh that was good of you! He was your bread cast upon the waters."

"I suppose he was. Anyhow, he came back 'soaked.'"—*Pittsburg News.*

THE BENEFIT OF EDUCATION.

Mistress: "Mary, you didn't half dust the front room. I was in there just now, and I could write my name on the mantelpiece."

Domestic: "Ah, mum, what a thing it do be to have an eddcation."

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THE BEAUTY OF BLUE.

"Blue," said a great artist, is the most beautiful thing in the world." Yet when he was asked to explain what he meant he could not say, except that it was the color of the sky and of a baby's eyes. Blue is the color of girlhood. The stage ingenue puts a blue ribbon in her hair to signify her type; the mother embroiders her baby's pillows and blankets in blue, in the Catholic church blue is the color consecrated to the Virgin. Everything that is loveliest and purest and best seems to be typified in the blue that one sees in the forget-me-not blossom. Then there are the deeper shades suggesting the sea, the rare blue of the different chinas, the blue dedicated to the navy, the blue of a soldier's coat, the blue ground of the flag upon which the stars are sprinkled. Blue is the color of beauty.

"There is more in color meaning than mere association." said a celebrated physician who is deeply interested in psychic problems. "Yellow is the color of the sunshine, and sunshine is one of the best and most beautiful of Nature's gifts to man. But yellow, from time immemorial, has been associated with vice and with traits that are contemptible. A 'yellow dog' has no friends in history. His color has made him a thing apart, while his mongrel brother, whose coat is black and tan, is accepted and loved. So a 'yaller dog' has become known as signifying the most contemptible type of human being."

THE SUNFLOWER.

In 1842, a Russian farmer named Eokareff, conceived the idea of extracting oil from the seed of the sunflower. His neighbors told him it was a visionary idea, and

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that he would have his labor for his pains. He persevered, however, and from that humble beginning the industry has expanded to enormous proportions. To-day more than seven million acres of land in Russia are devoted to the cultivation of the sunflower. Two kinds are grown, one with small seeds, which are crushed for oil, and the other with larger seeds, that are consumed by the poorer people in enormous quantities.

We have often remarked the fact that a man who wears side whiskers is a philanthropist or a fake; no half-way man wears side whiskers. Two men used to live in Philadelphia; they both wore side whiskers and they represented the two types above mentioned. One was George W. Childs, the other was Keely, the motor man.

THEN HE UNDERSTOOD.

The cyclist was a stranger in literary Fleet Street. That was evident from the cautious manner in which he picked his way through the half-empty thoroughfare. It was evening. The penny-a-liner approached him:

"Sir," said he, "your beacon has ceased its functions."

"Sir," gasped the cyclist.

"Your illuminator, I say, is shrouded in unmitigated oblivion."

"Really! but I don't quite—"

"The effulgence of your irradiator has evanesced."

"My dear fellow! I—"

"The transversal ether oscillations in your incandenser have been discontinued."

Just then an unsophisticated little paper boy shouted across the street:

"Hey, mister, yer lamp's out."

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Lowell Textile Journal.

WARP DRESSING.

There are three important factors involved in the art of dressing warps, viz: the yarn, the machine and the man. If either of these is lacking the work can not be performed. If either of the three is lacking in certain peculiar qualities or qualifications the work cannot be properly done. These three instrumentalities will receive consideration in connection with the work.

The spooler tender is obliged to use the yarn that is brought to her, whether it is properly carded and spun or not. She is not to blame for imperfect work done before the yarn reaches her. The picking, the carding and the spinning, if imperfectly done, each leaves its impress upon the yarn in such a way that the spooler, the dresser, the weaver, the finisher, and ultimately the manufacturer himself, must suffer the deteriorating effect upon the result of their effort. The roping often comes to the spinner with uneven places, too much stock in one place and the fibres so loosely rolled or so few of them in other places that the spinner must throw out the piece or make a thread that will leave a serious defect in the cloth. Again, the spinner sometimes pulls too much off the the spool of roping so that because of the difference in the diameter of the spool where the thread leaves it, it is of necessity drawn out more and thus a finer and harder thread is made; or in "piecing up" the ends are twisted together when the "jack" is "out," and from two to five feet of the thread has less twist than the others and trouble is made for all who handle the yarn afterwards.

The spooler tender and the dresser tender can remedy some of these defects, but it is at the expense of a loss of time and a loss in the amount of production, which could be obviated if those who manipulate the stock before it reaches them did their work as it should be done.

But the work of the spooler tender is more than simply to tie in the bobbins, start up the spooler and take off the spool when it is full. Fine yarn needs different treatment from coarse yarn. A soft or slack twisted thread should not be spooled the same as a hard thread. All wool yarn ought not to be handled the same as two-thirds cotton. Worsted yarn requires different methods from either of the others, etc.

Yarn that reaches the spooler in good condition is sometimes seriously injured in the process of spooling. The tension on the yarn as it runs from the bobbin to the spool is often too tight, thus straining the yarn until much of the strength of the thread is lost. The *tension* should be *carefully adjusted* to the *quality* of the yarn. If two or more spoolers are running on the same yarn, the tension should be as nearly the same on all as possible. Failure on this point may be the cause of a section stripe which would be almost impossible to trace. Care should always be taken to have each thread run without undue friction through the guide wire, the roller guide and the spool guide so that the tension on *each thread* shall be the same; otherwise there may be a " hole " in the spool, causing the thread to run tight off the spool in dressing and consequently breaking more often on the loom, and not only hindering the weaver but sometimes even making a " thread stripe " in the goods, another defect which may be hard to trace. Waste should not be allowed to gather in any of the guides. The spooler tender should *know how to adjust the weights on the spools according to the quality of the yarn*, so that the spools shall not be too hard or too soft, and also to have all the spools of like hardness.

In spooling fine yarns the holes in the spool guide should be small, causing the thread to move quickly, as it responds to the action of the vibrator. The vibrator should be made to move just far enough, but not too far. Much delay is sometimes caused the dresser tender by lack of sufficient care in filling the space belonging to each thread on the spool. The overseer should never leave the spooler after " changing the guide " until he is sure this is right.

Some manufacturers would make more money if they would use more of their old warp spools for kindling wood. A crooked spool ought never to be used; if it cannot be made straight the best place for it is under the boiler and not on the spooler or dresser. It is not an uncommon thing for a

dresser tender to waste enough time in "running out" one crooked spool to pay for two or three new ones (besides the "big words" that come into his mind and perhaps tingle the ears of any person who may be within hearing distance) not to speak of the injury to the warp he is dressing. The spooler tender should discard every crooked spool. It does not pay a manufacturer to buy cheap spools. The best there are made are none too good. Many of the spools in use have the "shaft" screwed into the wood, with no nut on the end. These are not worth the freight charges. Some are made of wood not properly seasoned and they warp when they become dry and are thus rendered unfit for use. Others have a small "barrel" and a heavy "head," and become crooked by the weight of the yarn or other spools piled upon them. A well-seasoned maple spool, with *hard wood* rim around the head and *double* nuts on the end of the spool shaft, is about as serviceable as any.

The driving belt on the spooler should be as loose as it can be and carry the spool easily. If it is too tight the spooler starts too abruptly, and if the yarn is tender some of the threads are liable to break in starting up the spooler.

The drum belt should always be kept reasonably tight. Some spooler tenders have a habit of putting their foot upon the drum belt when starting the spooler in order to increase the power (at the expense of the durability of the belt). This is not necessary if each barrel is well oiled and there is no unnecessary friction.

Very little power is needed to run a spooler, if it is set level and in order in all its parts. The overseer would better spend an hour, or even half a day, in "fixing" a spooler than have it run when out of order at the expense of added power and useless wear of the belts and bearings.

Talk of a wood famine. There are thousands of cords of drift wood on the shores of the islands at Stony Lake. This spring immense quantities seem to have been deposited along shore. There are fully a hundred cords of fine logs piled up on Mr. R. Neil's island, kindly left there by the ice and receding water. Other islands have received more than a generous share. Presently some genius will devise a floating saw mill and tow the business about the lakes, cutting up what he may find. Almost everyone would be heartily glad to get rid of the logs, as now the only way to get short of them is to start the wood off on a trip to the next adjacent island.

TEXTILE SCHOOL.

THE FINEST OF ITS KIND IN THE COUNTRY.

The Textile school is a state and a city institution. It is designed to teach students the elements of manufacturing. It is a permanent thing and will continue to spread its influence abroad for years to come. It was established by the State in the "Mother Textile City of America," and the city contributes towards its support. It was opened in 1897 and has already demonstrated the wisdom which established it.

It has a fine faculty, and its curriculum is yearly being extended. It is now the finest textile school in America and with hearty support will keep to the title. There are four regular courses: cotton manufacturing, wool manufacturing, designing and chemistry and dyeing. These courses are taught to day scholars, and the admission fee is $100 for residents of the state, and $150 for those who reside out of the state. Then there are free classes for those who work during the day. They are the evening classes which are just as thorough as those held during the day.

The school is liberally supplied with machinery of the very latest design, and is as well adapted to its present environment as it is possible to be. Mr. A. G. Cumnock is the president and Mr. Wm. W. Crosby the principal of the school, and the corps of teachers are men who have earned reputation in the branches they teach.

Here we have a school which few of us know anything about, or take any special pride in its courses. Why we should be so indifferent is something we do not know. We are a manufacturing city; our interest should be keen for anything that will improve our manufactures. Here we have opportunity for learning the mysteries of the science, for it is a science to manufacture a piece of cloth. That learned, our service has a value which no other knowledge can cheapen and we go forth to elevate the manufacturer's position by the skill we have.

But the school is not perfect, it lacks one or two things which will make it an ideal factor in education. One of these is a permanent

building, and the other a permanent exhibition. The building must come by-and-by. It will be an honor to the state when it is finished and will perhaps equal, if not exceed in beauty and proportions, the magnificent temple in Manchester, England.

The permanent exhibition is another thing and should be established without reference to the permanent building. Of course, when that is finished it will contain provisions for the exhibition, but what is needed now is an exhibition which will show the people the character and purpose of the school. Mr. Frederick A. Chase, the city librarian, has an idea which will do much to help the trustees of the school to carry out their plans. He proposes that the school establish an exhibition and place it in the basement of the Memorial building. There it would have place for a time, or until some other permanent place was secured. An exhibition in the library building would give the school a publicity it does not now enjoy and would show forth the things it taught. Mr. Chase will undoubtedly have the support of the trustees of the library in his plan, and he certainly will find the faculty of the school very much in its favor.

I saw Mr. Crosby and had an interesting talk with him about the school and its work. He was enthusiastic about the school, and was somewhat surprised that the people of Lowell knew so little about it. It seemed to him that they did not realize the power it had. He was glad however to say that he had had more applications from Lowell students than he had last year, and that he takes to mean a wider knowledge of the school and its scope. He thought a permanent exhibition would be of great assistance in spreading a knowledge of the school. He entered most heartily into Mr. Chase's proposition for an exhibition in the library building. He suggested exhibits that might be prepared, and said he had already examples of the work that might be exhibited.

According to his idea, the exhibition should consist of samples of the work done. For instance, it could be shown how the cotton is made into cloth, by an exhibit of all the stages of preparation. So, too, with the woolen and the worsteds. The designs and the material of which they are the pattern could be shown, and the effect of the dyes.

It is interesting in this particular to recall what the late J. S. Ludlam had in mind. He wanted a permanent exhibition of manufactured

goods, and believed it would be of immense value to our industries. He proposed to obtain from Mulhausen, in Alsace, a duplicate of the exhibition there, which is the finest and the most complete in the world. There is such a duplicate in Manchester, England. Perhaps that suggestion might be carried out and the exhibit be named for him.

When we consider what our occupation is we should be suprised that we should be so laggard to learn the art of our trade. The time is coming when the mills of Lowell will not make the cloth they do now; they will not make prints or calicos, but they will manufacture the daintier materials which women wear. For this change the textile school is preparing us. The school will open October 3d, and all who have an interest in it will be welcomed to see the marvels it contains.

LOOKING FOR THE NUMBER.

"What are you examining so closely, Johnnie?" asked mamma.

"A hair, mamma. Teacher said in Sunday school that every hair of your head is numbered, and I am looking for the number on this one."

GOLF.

Racing, racing; over the bounding space,
A blue ribboned cleek in my sun scorched fist, a crazed look in my face;
Racing, racing, through meadows and brooks and pits,
I would that the one that invented golf were possessed of ninety fits.

Plunging, stumbling, beating the air and brush,
Ah me but this sport knocks buttons off, that Mrs. DeGrundy's crush;
Scrambling, gambling, here comes another fence.
Why do we play what we really know makes us look like thirty cents?

Panting, gasping, winded and worn and lame,
Never let on you're the fool you are as long as you're in the game,
Pounding, smashing, where is the freckled pup,
And then I can hear as the soft breeze sighs, "Wy don' dat ol' guy back up!"

Ormsby A. Court.

Blister: "Here is some tobacco, my poor man. You must feel the loss of a smoke after dinner."

Beggar: "Yes, sir. But I feel the loss of my dinner before the smoke a good deal more."

Brown—"You can always tell a young man who is just out of college."

Jones—"That's just where you are wrong. You can't tell him anything."—*Ohio State Journal.*

WHAT IS A WOOLEN THREAD AND WHAT IS A WORSTED THREAD.

By VICKERMAN.

Commercially speaking wools are divided into two great classes: clothing wools and combing wools, or short wools and long wools, and the fabrics woven from them are termed woolens or worsteds, according as one or the other was employed. But we can no longer draw the line in this way between the two great branches of the wool industry, for the wools that are called combing wools are now very frequently used for woolen goods, and wools that are sold as clothing wools are frequently used for combing. Formerly long wools only could be combed when combing had to be done by hand, but since the successive improvements of the combing machine by Donisthorpe, Lister, Heilmann, Noble and Holden, any free, firm stapled clothing wool of 1 $\frac{1}{4}$-inch staple can be combed.

Fine Botany qualities of worsteds are now in the market in 50s and 60s.

The real distinction between worsted and woolen does not lay in having a long wool for the one and a short wool for the other. You can comb almost any wool that it suits your convenience to comb, or you can take any of the so-called combing wools and use them for clothing purposes. The distinction is not in the wools but in the two distinct modes in which the wool is worked or manufactured into yarns. Take identically the same wool and follow out certain modes of working and the result is you have a worsted yarn. Follow out certain other modes of working with the same wool and the result is a woolen yarn. I will approach the consideration of the structure of the woolen thread from the negative side and show first what the woolen thread is not, that we are not entitled to call any thread we can manipulate out of wool a woolen thread in certain senses, because a worsted thread is made of wool and yet we don't call it a woolen thread; we very properly call it what it is — a worsted thread.

We must designate yarns according to the modes in which they

have been produced. But some of you at this point may be now ready to ask what is a worsted thread and what is a woolen thread, as you say the distinction is not in the wool. I will try to answer both these questions, and in order that we may realize to our minds more distinctly the difference in question I will first show as rapidly as I can what the woolen thread is not, that we may see more clearly what it is by the contrast.

We will presume to take a lot of wool, say fourteen bales, from one of our Boston wool warehouses, and in order that there may be no mistake as to our starting from exactly the same point and with exactly the same material in each case, we will turn the wool out of the bales and make a square pile of it upon the floor of the wool room, making a layer of each bale so that the whole may be of uniform quality when taken down off one end. Having our pile of wool fairly mixed and fairly divided again into two equal portions you see clearly that there cannot possibly be any difference in the material to begin with, and the difference in the end must be wholly ascribed to the difference in the processes employed in converting the one portion of wool into worsted yarn and the other portion into woolen yarn.

Let us proceed, then, with that portion of wool that is intended for manufacturing into worsted, in order to show in the first place what a woolen thread is not, and then afterwards point out by contrast, and more in detail, what a woolen thread is.

The first operation is sorting the wool into two or more qualities and taking out the short wool, technically termed "shorts" or "brokes." The short wool has to be taken out for reasons that will appear presently. After sorting, the wool is next taken and scoured, to rid it of its natural grease or yolk, then partially dried. It does not answer to have the wool thoroughly dried, as when preparing for woolen yarn, and at many places it is not put on the stove or drying machine at all but through a pair of very powerfu press rollers, out of the warm liquor and straight to the carding machine, which much resembles our large cylinder carding or scribbling machines, ordinarily called the first breaker. From the carding machine it is doffed in a rope sliver and formed into a large ball.

Several of these balls are placed in front of a gill-box. The gill-box is a narrow trough or box with a pair of drawing rollers at each end and across the bottom of which, transversely, are placed

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rows of gill pins. The object of pulling the sliver through these rows of gill pins is to roughly force the fibres into a form parallel to each other, just as you force portions of your warps into parallel order by pulling the warps through a fine raddle or comb. The gill boxes serve the purpose of combing or raddling the slivers and compelling all cross fibres to fall into rank and march in order with the regiment. The slivers are crossed and recrossed by being put up eight or ten at a time and passed sometimes through two and sometimes through three gill-boxes before the slivers are fit to send to the combing machines. I may here say that the object of carding the wool is to break up the natural arrangement of the fibres of the wool in which it grows upon the sheep's back, that is to say, to break up the natural arrangement in order that the fibres may be arranged artificially into textile threads. Prior, however, to the commencement of this artificial arrangement another process has to be gone through at this point, namely, that of combing to get out the noil.

The term is from the Latin and means *not do.* I have just said that the combing has to be performed in order to get out the noils, and the noils is that portion of the wool that is short, curly and knotty, and which will *not do* for worsted, and has to be sold as waste along with "shorts" and "brokes." After combing, the top or sliver is again passed through gill-boxes to get the straggling fibres again into their ranks, after which it goes to the drawing frame and then the roving frame till it finally reaches the spinning frame. Here the roving

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passes through a pair of strong iron rollers and thence through two or three sets of carrier rollers of much lighter build, and then finally through the front rollers, each set of rollers running quicker than the set preceding it, thereby elongating or drawing out the roving to the requisite degree of fineness, and as the finely attenuated sliver emerges from the front, or final set of rollers, it begins to receive the twine necessary to give strength and firmness, and when it has descended to the spindles and has been wound upon the bobbins, the manufacture is completed, and it is a worsted thread. The result is reached by two simple processes, conducted continuously and following each other consecutively. Firstly, the sliver is drawn to its required degree of fineness by means of rollers, then secondly, the twist is given afterwards as a separate operation.

"Well, Tommy, you got whipped in school today?"

"Yes, but it did not hurt."

"But you certainly have been crying?"

"Oh, I wanted to let the teacher have a little pleasure out of it, so I made out it hurt like blazes."

—*Texas Siftings.*

Barber—"Want a hair cut?"

Student—"Naw, want 'em all cut."

On a muddy crossing even the most modest woman may raise her dress a little above two feet.

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BY

THE LOWELL TEXTILE JOURNAL COMPANY.

Entered at the Post-Office at Lowell as Second Class Mail Matter.

SUBSCRIPTION TERMS.

For one year, postage paid 50c.
Single Copies 5c.
For Sale at all Newsdealers

Advertisements must be at the Journal Office before the fifteenth of each month for insertion that month.
Contributions may be sent to Editor of The Lowell Textile Journal, and will receive prompt attention.

EDITORIAL.

September was a very Dewey month.

. . .

To business that we love, we rise betimes and go to it with delight.—*Shakespeare.*

. . .

In textile teaching there are two things necessary: practical experience and practical knowledge.

. . .

The work of the students in textile design is now on exhibition in the Exhibition Hall, Public Library, Lowell.

A man who cannot mind his own business, is not to be trusted with the King's.—*Saville.*

. . .

The censure of those that are opposed to us, is the nicest commendation that can be given us. —*St. Evremond.*

. . .

It is very encouraging to have students come to the school, who have had four and five years practical work in the mill.

. . .

Those who quit their proper character to assume what does not belong to them, are for the greater part ignorant of both the character they leave and the character they assume.—*Burke.*

. . .

It will be well for you to remember that the billiard room and skittle alley are not the most direct roads to the accomplisment of your ambition, and whatever prominence you may attain will be the result of your own industry and frugality.

. . .

Make yourself master of every detail in the business; cheerfully do whatever task is laid down for you; be civil and obliging, and some day you may occupy a seat in the directors' room of some successful cotton or woolen mill.

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The "Rubes or Hayseeds," whatever they may be called, are here to stay. They understand how to turn a sheaf of grain by practical experience, their knowledge was obtained by early rising, observation and hard work. The whiskers on their faces is not the growth of foppishness and a desire to look older and wiser, but the result of economy, time and labor.

. . .

As every ambitious young man who attends a textile school (day or evening) is confident of one day becoming an agent or owner of a cotton or woolen mill.

You cannot commence too early to fit yourselves for the responsible positions you have in view, and perhaps you will find that, outside of your assigned duties in the school, one of the best ways to fit yourselves for future responsibilities would be found in regularly reading the contents and studying the lectures and essays presented in the first-class trade journals, such as the Textile World, Cotton and Wool Reporter, and Wades' Fibre and Fabric.

. . .

Fifty young women have taken up the study of scientific farming at the Minneapolis College of Agriculture, and the result of the new departure will be watched with interest throughout the country as affecting the welfare of the sex. If the innovation shall prove successful it will naturally spread to other agricultural States, and its most important results may turn-out to be social rather than directly agricultural in character. Heretofore one great drawback to farming has been the difficulty of keeping the boys upon the farm. With trained and educated girls taking up the profession, the old homestead farming would take on a new charm, and the hegira of farmers' sons to the city would be checked if not entirely done away with.

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THE VALUE OF TECHNICAL EDUCATION.

From COTTON AND WOOL REPORTER.

I have had occasion at various times to refer to the value of technical education, not only to the way in which it benefits the workmen, but also to the bearing it has on the manufacturer. In order to add additional emphasis to my previous arguments that it is to the manufacturers' interest to encourage and support technical education, I will quote from a letter before me from one of the largest employers of labor in this city, who is combating the fallacious argument that technical colleges produce only theorists. The writer is an engineer, and he speaks from that standpoint, but what is said applies equally to textile workshops. He says: "It is true that the practical side of a boy's education can only be obtained in the works, but in our own works we have a number of boys who have been students at the technical college, and we have every reason to be satisfied with them. We take them in preference to others who



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have not had the benefit of a technical training. I consider that these classes do a great service to our trade. I consider that the technical schools are worthy of more municipal support than they at present receive, for it is at such institutions that the man who will have the future guidance and management of our industries can receive the highest education so necessary to enable us to hold our own with the thoroughly educated employers and managers we find in many foreign workshops."

Technical education in England in the textile branch of industry is very much indebted to the company of cloth makers of London who have spent a good portion of their annual income in building and endowing textile schools in various parts of the country. This company has a large income, amounting to $285,000 a year, which is derived from real estate in London, which has been bequeathed to the company by various rich cloth makers in past ages, for charitable purposes. The company dates back to the year 1350, and in that year one of their number was appointed official measurer of cloth by the government. His business was to measure all English woolen cloths before they were brought into the market, and then affix his seal. This measurement was to be the standard of measure between buyer and seller, and to prevent all disputes about short measure.

One almost wishes that some such official was in existence now when claims for short measure come in. This official measurer had to measure at the creased or "rigged" edge. Any one found dealing in shoddy cloth was to be severely dealt with. This cloth was confiscated, and given to the poor, and the poor maker was lia-

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ble to a penalty of having his ears cut off. How thankful many makers in this city must be that such a law is not in force now, although I know some people in America three years ago who would have been glad to adopt some such drastic means with the makers of some of the heavy cheap stuff which was dumped into New York during the Wilson tariff.

ORIGIN OF THE NAMES OF FABRICS.

About the year 1329 the woolen trade of England became located at Worsted, about 15 miles from Norwich, and it was at this place that the manufacture of the twisted double thread of woolen, afterward called worsted, was first made, if not invented. Linsey-wolsey was first made at Linsey, and was for a long time a very popular fabric. Kerseymere takes its name from the village of Kersey, and the mere close by it in the county of Suffolk. We have to thank Gaza, in Palestine, the gates of which Sampson carried away, for gaze, or gauze. Gaza means "treasure," and precious to the fair is the tissue which covers without concealing their charms. Voltaire, wishing to describe some intellectual but perhaps dressy woman, said: "She is an eagle in a cage of gauze." Muslin owes its name to Mossoul, a fortified town in Turkey in Asia. Tulle obtains its name from that of a city in the south of France. Travelers by rail in Brittany often glide past Guingamp without remembering that it was here that was first produced that useful fabric, gingham. Damask derives its name from the city of Damascus; calico from Calicut, a town in India, formerly celebrated for its cotton cloth, and where also calico was printed; cambric from Cambray, a town in Flanders, where it was first made; and tweed from a fabric worn by fishermen upon the river Tweed.

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ENAMELLING PRINTS.

Most people admire a fine photograph taken on plain paper, having a matt surface, but many also highly applaud one of precisely the reverse character, in which the surface is not only smooth but glassy, the grain of the paper being oblite. rated. When a small oval portrait is "glaced," it is a matter of extreme difficulty to distinguish between it and a similar portrait which has been vitrified or burnt in upon an enamel plaque.

But not alone is enamelling applicable to portraiture; landscapes also have a wonderful degree of lustre imparted to them when subjected to the glace process.

In enamelling prints the first requisite is a plate of glass. This must possess a flat and well polished surface and be quite free from scratches or other imperfections. The necessity for this will be apparent when we say that the most minute defect on the surface of the glass will be afterwards visible, more or less plainly, on the print when finished. Plate glass should be preferred to any other. The plate having been obtained, it must next be made quite clean, a final polish being given with a washleather. A number of plates ought to be prepared at a time, and after being cleaned, each in

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succession should be stored away in a grooved plate box.

It is difficult to lay down any rule for determining the size of the plates, but it will conduce to ease in working if the dimensions be such as to permit of from six to twelve small pictures being laid down at a time. For half plate size, four pictures will be a suitable number to place on one plate, two prints of whole plate size sufficing. But this is matter for the individual convenience of the operator, who, if he chooses, may employ plates no larger than the pictures.

Next take a small quantity of powdered French chalk, and tie it up in a piece of muslin, so as to form a ball the size of a walnut or an egg. This is applied to every portion of the surface of the plate with a fair amount of friction, beginning at the centre, and taking particular care that no portion is omitted. Inattention to this will cause the picture to adhere to the glass at a subsequent stage instead of stripping clean from off it. Having dusted off the superfluous chalk, coat the plate with plain collodion. Some of the finest enamels we have seen were made with collodion consisting of four grains of pyroxyline and four drops of castor oil dissolved in half an ounce each of methyleted alcohol and ether. But almost any good plain collodion will serve the purpose, provided a little castor oil is added to impart toughness. The plates thus collodionised, after being allowed to stand for half an hour, should receive a coating of gelatine, which has been prepared by pouring upon it a quantity of cold water just sufficient to cover it.

After standing for a few hours to permit of the water being ab-

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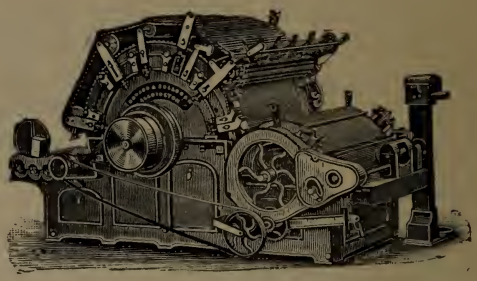
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sorbed, the vessel containing the swollen gelatine is placed in a larger one of hot water. This immediately affects the liquefaction of the gelatine, which is then filtered through muslin into any convenient bottle having a wide mouth, which should previously be made warm by immersion in hot water or otherwise, to prevent any fracture that might occur through filtering warm gelatine into a cold bottle.

The gelatine thus prepared is applied both to the collodionised plate and also to the print. In the former case, a little is poured on the centre and spread by guiding it over the surface by a slip of stiff paper or a glass rod, after which the plate is left in a horizontal position until the gelatine sets, when it is reared up on end and allowed to dry. As the plates when thus treated keep well, enough may be prepared at a time to serve for a whole season.

When required for use lay one of them face up on a flat table, and, having some warm gelatine (from the same stock bottle) poured out into a dish, immerse in it the prints and then lift them out one by one, and lay them face down upon the glass, arranging them side by side, so as to economize space. When they have all been placed down raise the glass and, looking through it, examine each print carefully to see that no air bubbles intervene. Wherever one is seen press the paper with a squeegee or the point of the finger and run it out to the margin of the print. We frequently se-

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cure the perfect adhesion of the print by passing a wet sponge over the back.

The glass plate with the adhering prints is next reared up in a current of air to dry, and the drying should be of a thorough nature. According to the state of the atmosphere the drying will take from twelve to twenty-four hours. We need scarcely say that by having recourse to a warm (not hot) current of dry air this time may be very greatly reduced.

When dry strip the pictures from off the glass and it will be found that they have a surface rivalling that of the glass to which they were attached. This surface consists of collodion, to which they are firmly secured by the intermediate layers of gelatine.

The presence of the castor oil in the collodion so toughens the film as to prevent it from easily getting scratched or otherwise damaged.

INDIGO.

The chief source of natural indigo is the various species of *Indigofera*, especially *Indigofera tinctoria*, which are cultivated in India, China and South America. It is also contained in European woad (*Isatis tinctoria*) and a few other plants, the cultivation of which for the production of indigo was a flourishing industry from the ninth to the sixteenth century, and further, one which, thanks to the decrees of the ruling powers in England, France and Germany, was the cause of delaying the introduction of the "devouring devil's color," as the Indian indigo blue was formerly called. The cultivation of European woad is today almost an extinct industry, although up to the commencement of the seventeenth century it was a source of considerable revenue both in France and Germany.

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WOOL AND NOILS SCOURED, CARBONIZED AND NEUTRALIZED.

THOMAS HARTLEY. Lawrence, Mass.

The color is not contained in the free state in these plants, but as what is called a glucoside, to which the name of *indican* has been given. In this glucoside the indigo is held in combination with a kind of sugar — glucose—which former undergoes decomposition under certain well-defined conditions with the separation of indigo blue. It is the *Indigofera* plants of India, China and South America, especially the first of these, from which the color is now prepared. The method of its preparation is very simple, although considerable attention is paid to the treatment of the soil previous to the planting of the seeds. Ten to fourteen days suffice for the first appearance of the shoots above the soil, after which they continue to grow rapidly. Shortly before flowering, or about three months after sowing, the plants are cut off close to the ground, and are then ready for extracting the color. After cropping the plants are again allowed to grow until they are sufficiently mature to admit of a second cutting. Occasionally a third and even a fourth crop is made, but each of these contains successively less and less of the indican. The cut plants are at once placed in large stone cisterns or fermenting vats, called "steepers," where they are covered with water, and kept in position by means of boards and heavy stones.

TO HARDEN IRON ALL THROUGH.

Ox hoofs and leather are soaked in French nut oil, and are then burnt, pulverized and mixed with sea salt and potash. The following proportions are used: 30 per cent. of hoofs, 30 per cent of leather, 30 per cent. of sea salt, 10 per cent. of potash. This product is said to harden iron all through.

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CAUSES OF CARPET SPROUTING.

The surface of a Brussels carpet is composed of loops of worsted yarns packed closely together. When any one loop is formed, the particular worsted thread of which the loop is a portion sinks beneath the linen or cotton cross thread (weft) and remains with other threads in the body of the fabric until it is required to form another loop on the surface. These surface loops are held in position by the cross threads (weft), the closeness of the fabric and the intermingling of the various strands of worsted. Not being tied or knotted down, should any loop be caught or pulled by a sharp point in brush, broom, boot, paw or claw, then the worsted underneath will be drawn above the surface and the loose ends and tag will form a well developed case of sprouting.

The trouble is especially liable to occur in first class goods in which the yarn is fine, soft and highly dressed, and in carpets in which the ground is not well covered. In grounds well covered the threads cross each other frequently and are thereby held down more firmly.

There is but one remedy, and that is to clip off at once all the loose ends. With careful, close clipping the threads by degrees get flattened down and the trouble ceases.

In every case of complaint from a customer the dealer should be especially careful to place the matter in the hands of an experienced employe, whose special business should be not only to see to the remedy, but also to ascertain the cause of the trouble. He should keep a sharp lookout for dogs and cats, whose paws or claws may have started the threads. The casters of all articles of furniture in the room should be examined,

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and likewise all legs of tables, chairs, etc., not provided with casters. A rough caster or a jagged end of wood has caused many a case of sprouting. Nails in boot heels have likewise much to answer for in this direction. Parrots, given the freedom of a room, are apt to use both beak and claws on a carpet with disastrous effect. But the worst enemy of carpets is the common broom in the hands of a maid more muscular than intelligent. If possible the housewife should avoid sweeping a new Brussels carpet for some months; that is, until the loops get trodden down somewhat. If sweeping is regarded as absolutely necessary, the only proper thing to use is a good carpet sweeper run over the carpet with the utmost possible care.—*Carpet Trade Review.*

Teacher—"Why are you late, Willie Higs?"

Willie Higs—"My mother lost the stove cover, and I had to stay and sit on the stove till she found another."—*Ex.*

A most important feature of the scientific instruction in the lower grade of schools should be the collection of specimens which should form the subject of object lessons.





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WARE BROS.,

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THE TRADE RATS OF ARIZONA.

A miner near the Senator recently had a rather singular experience with trade rats, known also as mountain rats. As the nights were cold the miner took his ore sack to replenish his rather hard bed. Having neglected to come to town for several weeks, his supply of beans had given out, and he had come down to a diet of straight bacon. Considerably out of humor, he started in to pull his bed to pieces one morning, and in removing the sacks was agreeably surprised to find three pounds of beans, with a little coffee mixed, which the trade rats had brought from the Senator and stored in his bed.

The rats are native Americans, and very different from their imported Norway cousins. They are called trade rats because they generally leave some article in exchange for what they take away.

The miner states that he never killed a trade rat; that these rodents habitually steal from one cabin and carry their plunder into an adjoining one; that on one occasion he spilled a couple quarts of corn on the floor of his cabin and the next morning found the rats had stored away every grain of it in a pair of saddle bags hanging upon the wall.

HERE'S SOMETHING TO REMEMBER.

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194 Western Ave., Lowell, Mass.

He also states that the rats have thick caudal appendages, about three inches in length, which they keep constantly throwing up and down, striking the floor with each downward movement with the regular measured stroke of a musical professor marking time. They carry off plugs of tobacco, tooth brushes, combs and brushes, in fact, anything which they can manage to move.—*Prescott Courier.*

COLORLESS VARNISH.

Colorless varnish, for use on fine labels or other prints, as well as for whitewood and other spotless articles, is made as follows: Dissolve two and one-half ounces of bleached shellac in one pint of rectified alcohol; to this add five ounces of animal boneblack, which should first be heated, and then boil the mixture for about five minutes. Filter a small quantity of this through filtering paper, and if not fully colorless, add more boneblack and boil again. When this has been done, run the mixture through silk and through filtering paper. When cool it is ready for use. It should be applied with care and uniformity.

A DRUG EXPLOSION.

A student of pharmacy in Hesse was called upon to put up a prescription containing a 20 per cent. solution of chromic acid, salicylic acid and water. He put the crystals of chromic acid directly into the alcohol, whereupon an explosion took place, and the unfortunate student was severely burned in the eyes.

A mysterious ringing of electric bells in a Swiss house was traced to a large spider, which had one foot on the bell wire and another on an electric light wire.

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FEW COLLEGE GIRLS MARRY.

The charge made by the Rev. Dr. E. Winchester Donald in a speech delivered at Abbott Academy, Andover, Mass., that the methods of education followed in nearly all the female colleges make pupils unwomanly and too erudite has aroused much discussion at Bryn Mawr, Wellesley and other institutions included in Dr. Donald's arraignment.

The following statistics of the classes of '89 and '94 at Bryn Mawr are interesting:

Class '89—Ten years out of school, averaging now 32–33 years of age; 26 members, 11 married, 2 studied three years post graduate to take the degree of Ph. D. Neither of these has married.

Class '94—Five years out of school, averaging now 27–28 years of age; 20 in class; 3 married; 3 studied one year extra to take degree of A. M.; one stayed three years to take Ph. D.

Of 78 women who have held fellowships 10 have married, or 13 per cent.; of 161 graduates 39 have married, or 24 per cent.; of 225 girls who did not stay to take their degrees, 38 have married, or 17 per cent.; of 234 A. B.'s 32 married, or 14 per cent.

Fewer girls marry after taking the A. B. degree than those who do not graduate.

White lead is poisonous to most people; but there are examples of individuals who are unaffected by it. John Jarvis worked for over 50 years in the well known white lead establishment of Wetherill & Brother, Philadelphia, and always enjoyed good health. He lately died of old age. Thomas McCann was another example. He worked over 55 years in the same concern.

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SCOTTISH CLANS AND TARTANS.

"Nowhere beats the heart so kindly
As beneath the tartan plaid."

said the poet. So it is a pleasure in the small compass of this pocket volumn to read again of Brodie of Brodie, of Robert Bruce, of Maurice of Buchanan, of Cameron of Erracht, and of the many clans—Buchanan, Cameron, Campbell, Chisholm, Colquhoun, Cumin, Drummond, Fergusson, MacFarquhar, Forbes, Frazer, Grant, Gordon, Graham, Gunn, Johnson, Lamond, MacArthur and so forth down to Stewart, Southerland and Urquhart. It seems that the origin of clanship and tartans goes back beyond history. Agricola found 21 clans in Scotland in the year 81. A great deal about the tartans is related in the introductory note found in this book. There are lists of the native dyes, of the badges and the war-cries of the various clans: there is a map showing how Scotland and the near-by islands was partitioned, and then there is a brief historical sketch of the clans, together with illustrations of the tartans of the clans. The book is an unusually handsome and welcome importation.

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